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Operating Instructions

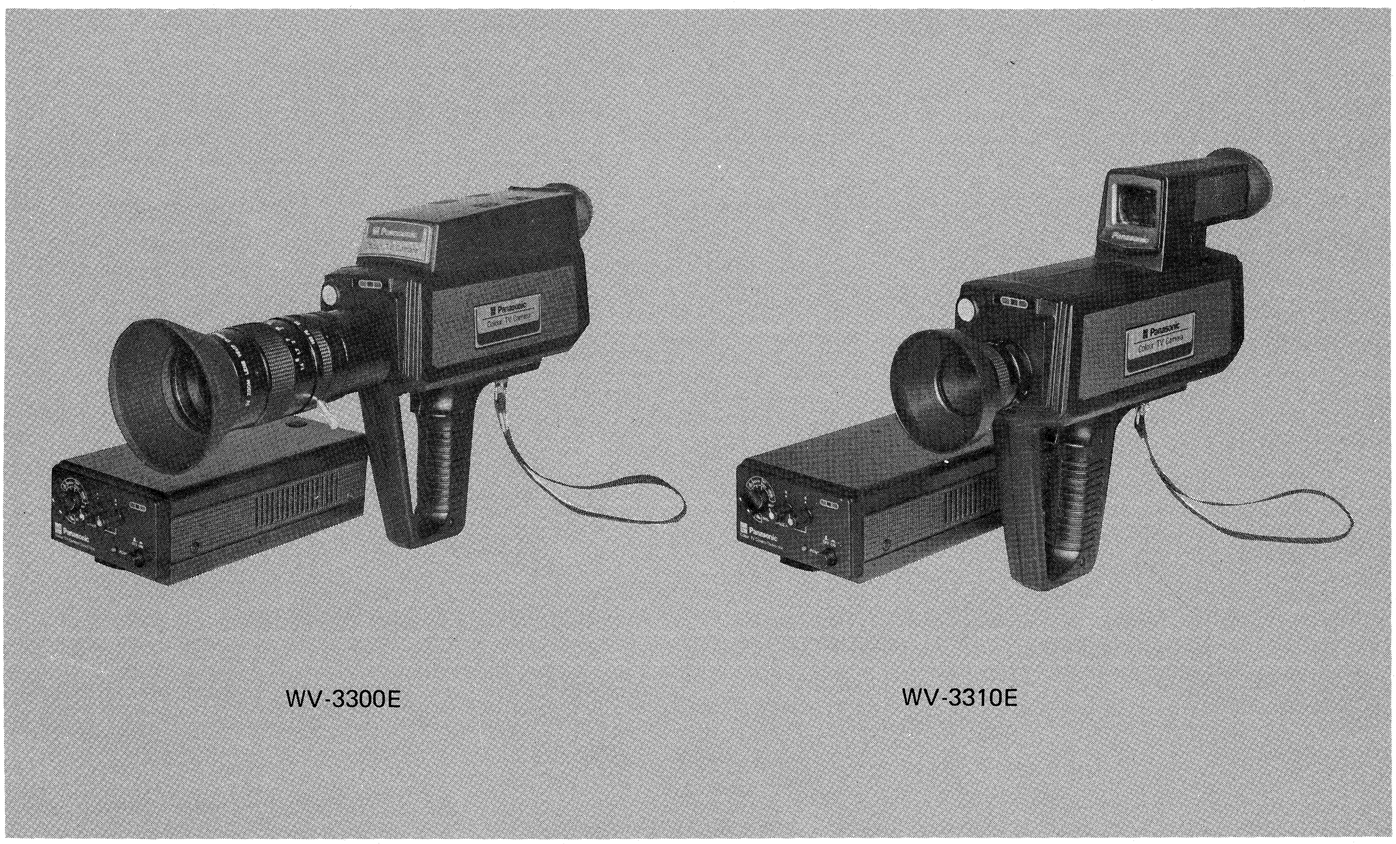
&

Service Manual

PAL COLOUR TV CAMERAS

WV-3300E/3310E

Operating Instructions
Vol. 1
Vol. 2
Vol. 3
Vol. 4


WV-3300E WV-3310E

Panasonic

Matsushita Electric Trading Co., Ltd.
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- This Operating Instructions & Service Manual is divided into the following five sections and each section begins with page 1.

• Operating Instructions	
• Service Manual Vol. 1.	Circuit Descriptions
• Service Manual Vol. 2.	Adjustment Procedures
• Service Manual Vol. 3.	Block Diagrams Schematic Diagrams Conductor Views Exploded Views
• Service Manual Vol. 4.	Replacement Parts List

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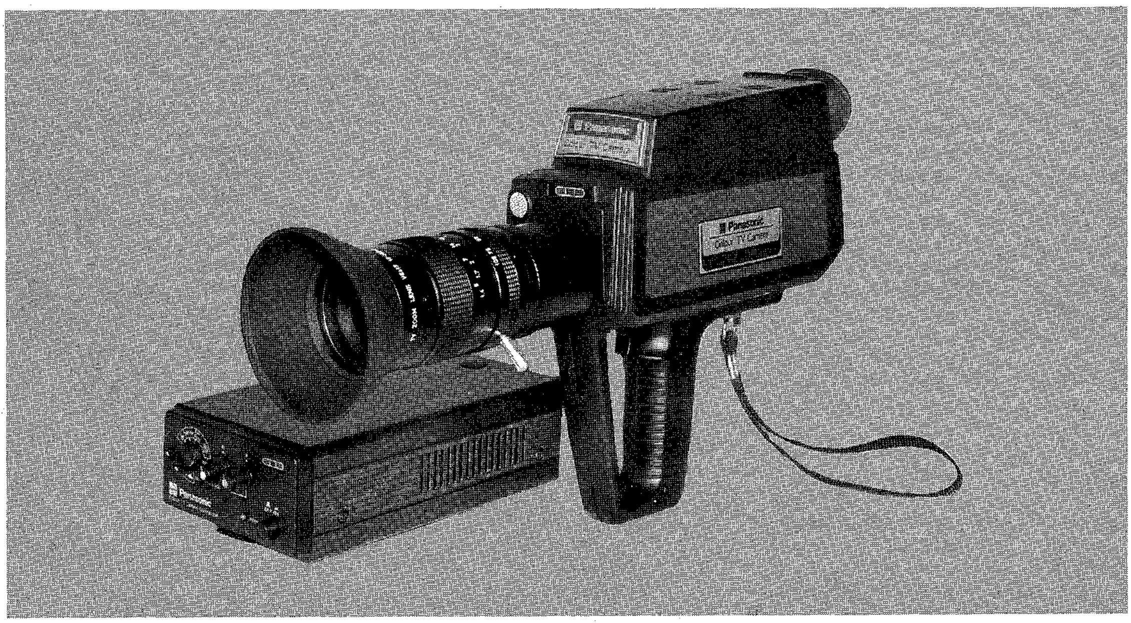
Vol. 4

Service Manual Vol. 4 — Replacement Parts List

Operating Instructions

Colour TV Camera

WV-3300E



Panasonic

Before attempting to connect or operate this product, please read these instructions completely.

PREFACE

This small, easy-to-carry camera features a new 1" vidicon tube. It can receive its power from the Camera AC adaptor (WV-3303E). The WV-3300E is a high quality camera that produces 250 lines horizontal resolution (luminance) with the recommended illmination of 140 footcandles (1400 lux) at f/4. Minimum illmination is only 10 footcandles (100 lux) at f/2.0. The 1.5" CRT viewfinder is mounted on the top of the camera head. The camera, balanced for 3200°K studio lights, has a four position switch that electronically converts the white balance and colour temperature for various light sources and intensities. Synchronous audio and video recording are controlled by a single trigger located on the camera handgrip.

FEATURES

1. One vidicon tube pick-up system.
2. WV-3300E features internal PAL sync.
3. Four-position electronic circuit for colour temperature conversion and white balance settings.
4. Minimum illumination is only 10 footcandles (100 lux) at f/2.0.
5. 1.5" electronic viewfinder (monochrome).
6. Three light intensity indicator lamps show proper light intensity. Tally lamp shows a recording is actually being made.
7. Built-in electric condenser microphone.
8. Camera head accepts C- mount lens for 1" vidicon.

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EINLEITUNG

Diese kleine handliche Kamera arbeitet mit einem neuen 1"-Vidicon. Die Stromversorgung erfolgt über den Kamera-Netzadapter WV-3303E. Die WV-3300E ist eine Kamera von höchster Qualität, die bei Blende f/4 und der emphohlenen Beleuchtung von 140 footcandles (1400 lux) eine Horizontalauflösung von 250 Zeilen (Leuchtdichtesignal) liefert. Die Minimalbeleuchtung beträgt nur 10 footcandles (100 lux) bei Blende f/2,0. Der 1,5"Sucher mit Elektronenstrahlröhre ist auf der Oberseite der Kamera angebracht. Die für 3200°K-Studioscheinwerfer eingestellte Kamera besitzt einen Schalter, mit dem in vier Schaltstellungen die Weißbalance und die Farbtemperatur auf die verschiedenen Lichtquellen und Lichtstärken elektronisch angeglichen werden können. Durch nur einen einzigen Auslöser im Handgriff der Kamera sind synchrone Tonund Video-Aufnahmen möglich.

BESONDERHEITEN

1. Aufnahmesystem mit nur einen Vidicon.
2. Die WV-3300E arbeitet mit intern synchronisiertem PAL-System.
3. Vierstufige elektronische Schaltung zum Angleichen der Farbtemperatur und Einstellen des Weißabgleichs.
4. Minimale Beleuchtung nur 10 footcandles (100 lux) bei Blende f/2,0.
5. Elektronischer 1.5"-Sucher (in Schwarz/Weiß).
6. Anzeige der richtigen Belichtung über drei Anzeigelampen. Während der Aufnahme rotes Aufnahme-Kontrollicht.
7. Eingebautes Kondensatormikrofon.
8. Kamerakopf mit dem üblichen C-Ojektivgewinde für 1"-Vidicons.

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WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

PREFACE

Catte caméra compacte, tenant bien en main, se caractérise par un tube vidicon de 1", qui peut être alimenté via un adaptateur caméra AC (WV-3303E). La WV-3300E est une caméra de haute qualité offrant une définition horizontale de 250 lignes (luminance) pour l'éclairement recommandé de 1400 lux à f/4. L'éclairement minimum est seulement de 100 lux à f/2,0. Le viseur CTR de 1,5" est monté sur le dessus de la caméra. Celle-ci, équilibrée pour des lumiéres de studio de 3200°K, dispose d'un commutateur à 4 positions permettant de moduler èlectroniquement la balance du blanc et la température de couleur en fonctions des différentes intensités et sources lumineuses. Les enregistrements sonore et vidéo synchrones sont commandés par un seul déclencheur logé dans la poignée de la caméra.

CARACTERISTIQUES

1. Un systéme de prise de vues par tube vidicon.
2. La WV-3300E possède un sync. PAL interne.
3. Circuit électronique à quatre positions pour la conversion de la température de couleur et les mises au point de la balance du blanc.
4. L'éclairement minimum est seulement de 100 lux à f/2,0.
5. Viseur électronique de 1.5" (monochrome). /ues réel
6. Trois lampes d'indication d'exposition indiquent l'intensité lumineuse convenable. Une lampe de signalisation révèle qu'un enregistrement est en cours.
7. Microphone à condensateur incorporé.
8. La tête de la caméra permet d'adapter une monture de lentille C pour vidicon de 1".

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VOORWOORD

Dezekleine, makkelijk draagbare kamera bevat een nieuwe 2,5 cm vidicon buis. Hij kan worden gevoed met de kamera netadaptor (WV-3303E). De WV-3300E is een kwalitatief hoogwaardige kamera, die een horizontaal oplossend vermogen van 250 lijnen (luminantie) heeft bij de aanbevolen lichtsterkte van 1400 lux bij f/4. De minimum lichtsterkte is slechts 100 lux bij f/2,0. De 3,75 cm CRT zoeker is bovenop de kamera gemonteerd. De kamera is ingesteld op 3200°K studioverlichting en heeft een 4-stajden schakelaar, die elektronisch de kleurtemperatuur voor verschillende lichtbronnen en sterktes instelt. Synchroonopname van audio en videosignalen geschiedt met behulp van 1 knop op de handgreep van de kamera.

EIGENSCHAPPEN

1. Opname met éém vidiconbuis.
2. De WV-3300E heeft inwendige PAL synchronisatie.
3. Een elektronische schakeling met 4 standen om de kleurtemperatuur en de witbalans in te stellen.
4. De minimum lichtsterkte bedraagt slechts 100 lux bij f/2.0.
5. 3.75 cm electronishe zoeker (zwart/wit).
6. Drie lichtsterkte indicatielsmpjes geven de heersende lichtsterkte aan. Een contrôlelampje signalerert wanneer opgenomen wordt.
7. Ingebouwde condensatormicrofoon.
8. De kamera heeft een lensvatting voor 2,5cm C vidicon.

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PRECAUTIONS

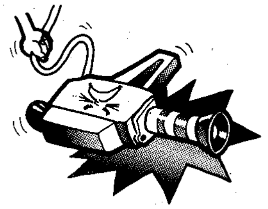
The WV-3300E is a sensitive, high quality instrument and should be regarded as such. Because it is an electrical device, the danger of electric shock exists if it is used carelessly.

x Do not attempt to disassemble the camera or CCU. In order to prevent electric shock, do not remove screws or cover. There are no user-serviceable parts inside.

x Versuchen Sie bitte nie, die Kamera oder Kamera-Kontrolleinheit auseinanderzunehmen. Entfernen Sie niemals Schrauben oder andere Gehäuseteile; dadurch vermeiden Sie Unfälle durch elektrische Schläge. Eingriffe im Innern des Gerätes sind dem Fachmann vorbehalten.

x N'essayez pas de démonter la caméra ou l'unité de réglage. Afin d'éviter les chocs électriques, n'enlevez pas les vis du boîtier. Celui-ci ne contient aucun composant susceptible d'être entretenu par l'utilisateur.

x Probeer de kamera of de CCU niet uit elkaar te halen. Om elektrische schokken te voorkomen nooit de schroeven uit de omkasting losdraaien. Binnenin kunt U toch niets zelf repareren.



x Do not. abuse the camera. Avoid striking, shaking etc. The camera contains a sensitive pick-up tube which could be damaged by improper handling or storage.

x Die Kamera nicht mißbräuchlich verwenden. Schlagen und Schütteln usw. vermeiden. Die Kamera enthält eine empfindliche Aufnahmeröhre, die bei unsachgemäßer Behandlung oder Lagerung beschädigt werden könnte.

x Prendre soin lors des manipulations de la camêra. Eviter les chocs, les secousses, etc. La caméra comporte un tube de prise de vues susceptible d'être endommagé par une manipulation our une mise en réserve inadéquates.

x Ga voorzichtig om met de kamera. Voorkom stoten, schudden enz. De kamera bevat een gevoelig opnamesysteem, dat bij onjuiste behandeling of bewaring kan worden beschadigd

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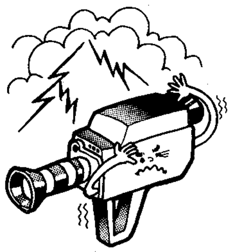
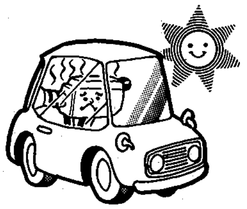


x Do not operate the camera and CCU in the field during an electrical (lightning) storm.

x Arbeiten Sie nie während eines Gewitters mit Kamera oder Kontrolleinheit im Freien.

x N'utilisez pas la caméra et l'unité de réglage en extérieur durant un orage (éclairs).

x Gebruik de kamera en CCU niet buiten tijdens een onweer.



x Do not leave the camera or CCU in a closed car or trunk when the temperature is high. Temperature can reach or exceed the limit for devices within the camera.

x Lassen Sie Kamera oder Kontrolleinheit nie bei hohen Temperaturen im Auto oder Kofferraum liegen. Die zulässige Temperaturgrenze für Bauteile im Geräteinnern könnte überschritten werden.

x Ne laissez pas la caméra ou l'unité de réglage dans une voiture fermée ou une malle lorsque la température est elevée. Cette température pourrait atteindre ou dépasser la limite pouvant être supportée sans dommages par les mécanismes internes de la caméra.

x Laat de kamera en CCU niet achter in een gesloten auto of kofferruimte als de omgevingstemperatuur hoog is. De temperatuur kan te hoog oplopen voor onderdelen in de kamera.

ZUR BEACHTUNG

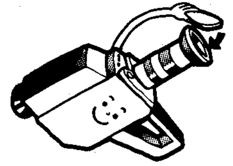
Modell WV-3300E ist ein empfindliches Qualitätsgerät und sollte als solches behandelt werden. Da es sich um ein elektrishes Cerät handelt, besteht bei unvorsichtiger Behandlung die Gefahr eines elektrischen Schlags.

PRECAUTIONS

Le combiné WV-3300E est un appareil sensible de haute qualité qui mérite d'être considéré tel que. Du fait de la présence de circuit électriques, le danger de courts circuits existe en cas de défaut de manipulations.

VOORZORGSMAATREGEL

De WV-3300E is een gevoelig, hoogwaardig instrument en moet als zodanig worden behandeld. Omdat het een elektrisch apparaat is, bestaat gevaar voor elektrische schokken als het onzorgvuldig wordt gebruikt.

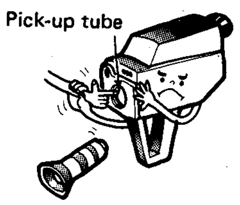


x Do not let the lens remain uncapped when the camera is not in use. If the lens is not installed, do not leave the lens mount hole uncovered.
Do not leave the lens cap on when the power is turned on. This can reduce the life of the pick-up tube.

x Das objektiv nicht unbedeckt lassen, wenn die Kamera nichit benützt wird. Wenn kein objektiv eingesetzt ist, die Öffnung der Objektivfassung nicht unbedeckt lassen. Den objektivdeckel nicht auf dem Objektiv lassen, wenn der Strom eingeschaltet ist. Dadurch kann sich die Lebensdauer der Aufnahmeröhre verrigern.

x Ne pas laisser l'objectif découvert lorsque la caméra n'est pas utilisée. Si l'objectif est déposé, ne pas laisser découvert l'ouverture de montage. Ne pas laisser le cache de l'objectif en placé lorsque la caméra est sous tension. Ceci pourrait avoir pour conséquence de réduire la longévité du tube de prise de vues.

x Laat de lens niet onbeschermd wanneer de kamera niet in gebruik is. Wanneer de lens van de camera is gehaald, de lensopening afdekken. Laat de lensdop niet op de lens als de stroom wordt ingeschakeld. Dat kan de levensduur van de opnamebuis bekorten.

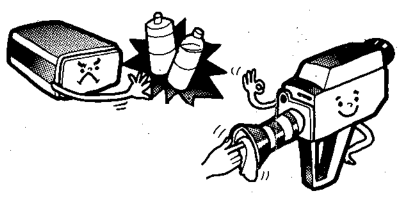


x Do not touch the surface of the lens or pick-up tube with your fingers.

x Die Oberfläche des Objektivs oder der Aufnahmeröhre nicht mit der Hand berühren.

x Ne pas toucher la surface de l'objectif ni le tube de prise de vues avec les doigts.

x Raak het lensoppervlak of de opnamebuis nooit met de hand aan.

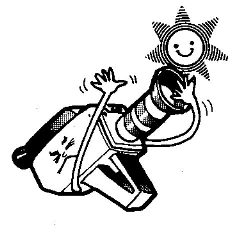


x Do not use strong or abrasive detergents when cleaning the camera body.

x Beim Reinigen des Kameragehäuses keine starken oder scheuernden Reinigungsmittl verwenden.

x Ne pas utiliser de détergents puissant ou abrasif pour nettoyer le boitier de la caméra.

x Gebruik geen krachtige of bijtende oplosmiddelen om de camera te reinigen.

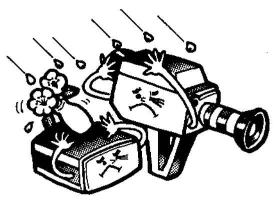


x Do not aim the camera toward the sun or other extremely bright objects, whether it is turned on or not. This action could permanently damage the pick-up tube.

x Die Kamera nicht auf die Sonne oder einen anderen extrem hellen Gegenstand richten, unabhängig davon, ob die Kamera eingeschaltet ist oder nicht. Dadurch kann die Aufnahmeröhre permanent beschädigt werden.

x Ne pas pointer la caméra vers le soleil ou des sources lumineuses trop puissantes, qu'elle soit sous tension ou non. Il pourrait en résulter des dommages permanents pour le tube de prise de vues.

x Richt de kamera niet op de zon of op sterke lichtbronnen, ook niet als hij is uitgeschakeld. De opnamebuis kan daardoor blijvend beschadigd worden.

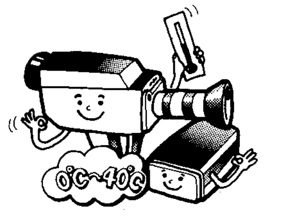


x Do not expose the camera or CCU to rain or moisture, or try to operate it in wet areas. Do not operate the camera or CCU if it becomes wet.

x Die Kamera oder das Netzteil nicht Regen oder Feuchtigkeit aussetzen und auch nicht an nassen Stellen zu bedienen versuchen. Kamera und Netzteil nicht bedienen, wenn sie nass werden.

x Ne pas exposer la caméra ou le bloc d'alimentation à la pluie ni à l'humidité. Ne pas opérer de prise de vues dans des zones trop humides, ni lorsque la caméra ou le bloc d'alimentation sont humides.

x Stel de kamera en de stroomvoorziening niet bloot aan regen of vocht, gebruik hem ook niet in erg vochtige omgeving. Gebruik de stroomvoorziening niet als deze mat is geworden.

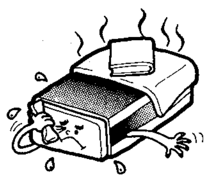


x Do not use the camera in an extreme environment where high temperature or high humidity exist.

x Die Kamera nicht in einer Umgebung verwenden, wo extreme Verhältnisse wie hohe Temperaturen und hohe Feuchtigkeit herrschen.

x Ne pas utiliser la caméra dans un environnement au climat trop extrême, notamment lorsque la température et l'humidité sont élevées.

x Gebruik de kamera niet onder extreme omstandigheden, waar hoge temperaturen en vochtigheidsgraden heersen.

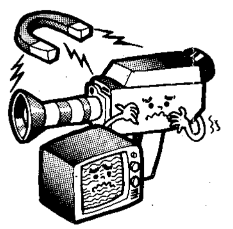


x Do not leave the camera and CCU turned on when not in use.
Do not turn the power on and off repeatedly without use. Do not block the ventilation slots.

x Schalten Sie Kamera und Kontrolleinheit bei Nichtgebrauch aus. Schalten Sie den Netzschalter nicht unnütz ein und aus. Verdecken Sie nicht die Belüftungsöffnungen.

x Ne laissez pas la caméra en position de fonctionnement lorsque vous ne l'utilisez pas. Evitez d'enclencher et de déclencher la caméra à brefs intervalles alors qu'elle n'est pas appelée à fonctionner. N'obstruez pas les rainures de ventilation.

x Laat de kamera en CCU niet ingeschakeld wanneer ze niet worden gebruikt. Schakel de stroom niet telkens nodeloos in en uit. Houd de ventilatiegaten open.

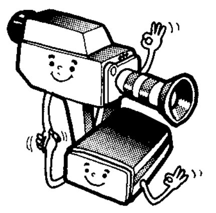


x Do not use near sources of strong magnetic fields.
Fluorescent lights, motors or other sources of magnetic fields may distort or otherwise adversely affect images.

x Benutzen Sie die Geräte nicht in der Nähe starker Magnetfelder. Magnetfelder von Leuchtstofflampen, Motoren oder anderen Magneterzeugern Können die Ursache für Bildstörungen sein.

x N'utilisez pas la caméra à proximité de sources de champs magnétiques de forte intensité.
Les lampes fluorescentes, les moteurs et d'autres sources de champs magnétiques pourraient déformer l'image ou en affecter la qualité.

x Gebruik deze apparatuur niet in krachtige magnetische velden. Fluorescerende lampen, motoren en andere magnetische velden veroorzakende voorwerpen kunnen het beeld vervormen en negatief beinvloeden.



x Do not mix cameras and CCUs. The camera and CCU are adjusted as a pair.

x Verwenden Sie immer die Kamera mit der dazu gehörenden Kontrolleinheit, da die Geräte paarweise aufeinander eingestellt sind.

x Ne mélangez pas caméras et unités de réglage. La caméra et son unité de réglage sont en effet étroitement accordées entre elles.

x Verwissel geen kamerá's en CCU's. Kamera en CCU vormen een hecht paar.

x Do not try to operate the camera and CCU on power sources other than 12V DC.

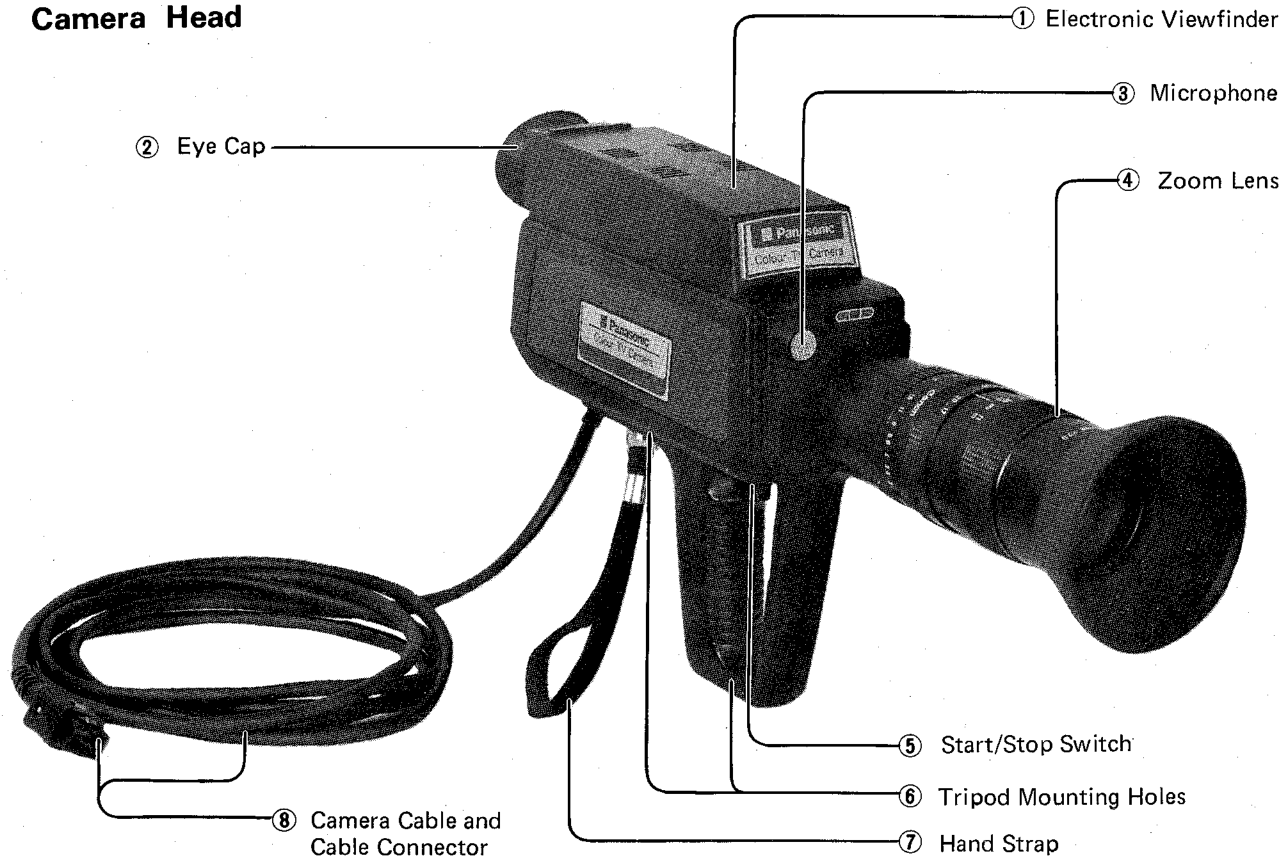
x Versuchen Sie nie, Kamera und Kontrolleinheit an anderen Stromquellen als an 12 Volt Gleichspannung zu betreiben.

x N'essayez pas de faire fonctionner la caméra au départ de sources de courant autres que celles livrant 12V CC.

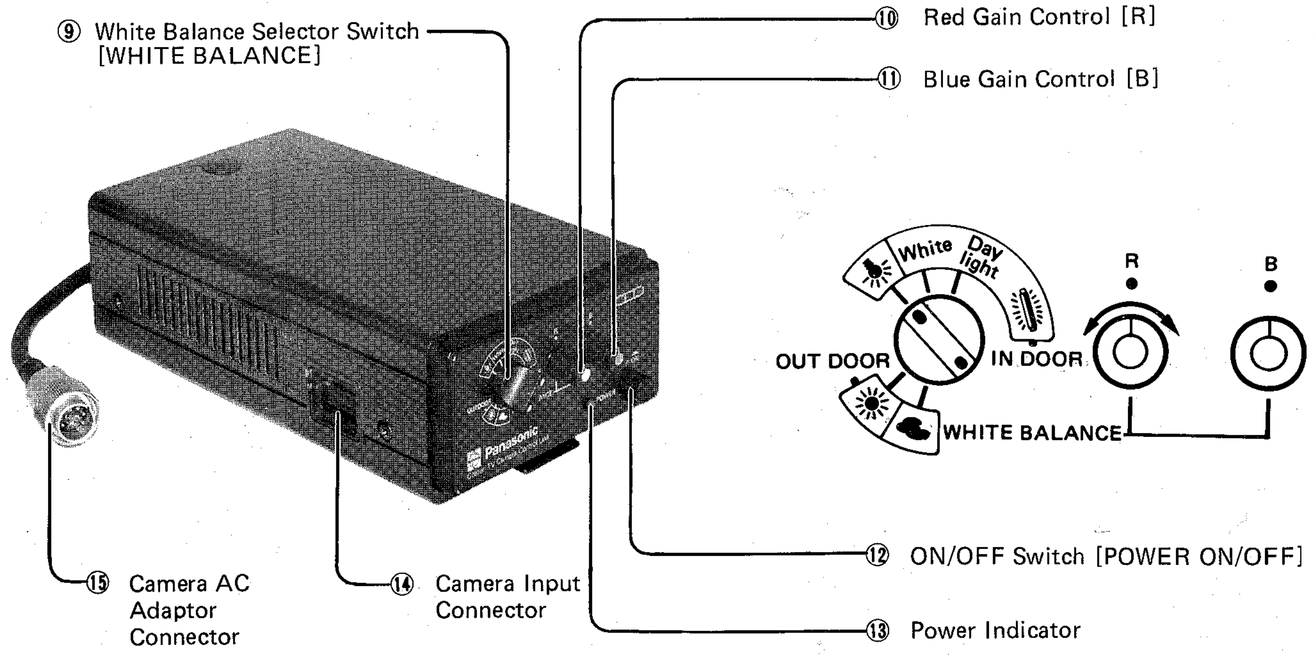
x Probeer nooit de kamera en CCU op andere stroombronnen dan 12V gelijkstroom te gebruiken.

MAJOR OPERATING CONTROLS AND THEIR FUNCTIONS
WICHTIGSTE BEDIENUNGSELEMENTE UND IHRE FUNKTIONEN
ORGANES PRINCIPAUX ET LEURS FONCTIONS
BELANGRIJKSTE BEDIENINGSORGANEN EN HUN FUNKTIES

Camera Head



C.C.U.



① Electronic Viewfinder
This is a small (1-3/8") TV monitor showing the actual picture which the lens sees.

② Eye Cap
Blocks out external light and magnifies the image when shooting.

③ **Microphone**
This is the pick-up for the built-in microphone. The microphone is most sensitive to sounds coming from the direction in which the camera is pointed.

④ Zoom Lens
This is an f 17~102 mm lens which uses the standard C mount.

⑤ **Start/Stop Switch**
(For National Panasonic VHS Video Cassette Recorder). This switch is used to start or pause the recorder. Press the REC button on the recorder. Squeeze the Start/Stop Switch once to record, squeeze again to pause. The tally lamp lights when the recording is in progress.
This switch is useful only when the remote control or Camera Cable is actually connected to the VHS Video Cassette Recorder.

⑥ **Tripod Mounting Holes**
These holes are used to mount the camera onto a tripod.

⑦ Hand Strap

⑧ Camera Cable and Cable Connector
This cable is connected to the cama Input Connector on the CCU.
This cable must be connected to the CCU to operate, since it carries power for the camera, and is used to carry video information from the camera to the CCU.
This video information is then forwarded to the video tape recorder.

⑨ **White Balance Selector Switch [WHITE BALANCE]**
Select the position according to the light source of which illuminates the scene being shot.

⑩ **Red Gain Control [R]**
If the picture on the screen appears reddish, turn this control slightly counter-clockwise.

⑪ **Blue Gain Control [B]**
If the picture on the screen appears blueish, turn this control slightly counter-clockwise.

⑫ **ON/OFF Switch [POWER ON/OFF]**

⑬ **Power Indicator**
This indicator comes on whenever the CCU is turned on, to let you know that the CCU is working.

⑭ **Camera Input Connector**
The cable from the camera is attached here using the camera cable connector. The camera gets its power through this cable and also sends video and sound information to the CCU. Be sure the cable connector is plugged in securely into the input receptacle.

⑮ **Camera AC-Adaptor Connector**
Connect to the Camera AC Adaptor (WV-3303E).

① **Elektronischer Sucher**
Der elektronische Sucher ist ein kleiner 1-3/8"-Fernsehmonitor, der das vom Objektiv aufgenemmene Bild zeigt.

② **Augemuschel**
Schirmt das Sucherbild gegen Fremdlicht von außen ab und vergrößert das Bild.

③ **Mikrofon**
Dieses eingebaute Mikrofon ist ein empfindliches Richtmikrofon, das bevorzugt in Richtung der Kamera-aufnahmeachse den Ton aufnimmt.

④ **Zoom-Objektiv**
Das Zoomobjektiv mit Normal-C-Gewinde hat eine Lichtstärke f/2 und Brennweiten von 17 bis 102 mm.

⑤ **Start/Stop-Schalter**
(Für National Panasonic VHS-Video-Cassettenrecorder). Dieser Schalter dient als Start-/Schnellstop-Schalter für den Recorder. Aufnahmetaste am Recorder drücken. Start/Stop-Schalter für Aufnahme einmal und für Schnellstop nochmals drücken. Währed der Aufnahme leuchtet das Aufnahmelicht.
Dieser Schalter arbeitet nur solange, wie am VHS-Video-Cassettenrecorder die Fernbedienung oder das Kamerakabel angeschlossen sind.

⑥ **Stativegewinde**
Diese Gewinde dienen zur Befestigung der Kamera auf einem Stativ.

⑦ **Handschlaufe**

⑧ **Kamerakabel mit Steckvorrichtung**
Dieses Kabel wird am Kameraeingang der Kontrolleinheit angeschlossen Dieses Kabel muß zum Betreiben der Kamera an der Kontrolleinheit angeschlossen sein, da die Stromversorgung der Kamera und der Transport der Videoinformation von der Kamera zur Kontrolleinheit über dieses Kabel erfolgen. Diese Videoinformation wird dann an den Videorecorder weitergegeben.

⑨ **Weißabgleich-Schalter (WHITE BALANCE)**
Dieser Schalter wird entsprechend der bei der Aufnahme zur Verfügung stehenden Lichtquelle eingestellt.

⑩ **Rot-Verstärkungsregler (R)**
Erscheint das Bild auf dem Bildschirm zu rötlich, so wird dieser Regler vorsichtig entgegen dem Uhrzeigersinn verdreht.

⑪ **Blau-Verstärkungsregler (B)**
Hat das Bild auf dem Bildschirm einen Blaustich, so wird dieser Regler vorsichtig entgegen dem Uhrzeigersinn verdreht.

⑫ **Netzschalter (POWER ON/OFF)**

⑬ **Netzkontrolleuchte**
Leuchtet auf, wenn die Kamera-Kontrolleinheit eingeschaltet wird, damit man sieht, daß das Gerät arbeitet.

⑭ **Kameraeingang**
Das Kabel van der Kamera wird hier mittels der Steckvorrichtung am Kamerakabel angeschlossen. Die Kamera erhält über dieses Kabel die Stromversorgung und sendet die Video- und Tonsignale über dieses Kabel an die Kontrolleinheit. Überzeugen Sie sich, daß die Steckvorrichtung fest eingeführt ist.

⑮ **Stecker zum Anschluß am Netzadapter**
Dieser Stecker wird am Kamera-Netzadapter (WV-3303E) angeschlossen.

① **Viseur électronique**
C'est un petit moniteur TV (1-3/8") permettant de voir l'image effectivement perçue par l'objectif.

② **Oculaire**
Canalise la lumiére extérieure et grossit l'image pendant le tournage.

③ **Microphone**
Cellule du microphone incorporé. Le microphone est le plus sensible aux sons émis dans la zone sur laquelle est pointée la caméra.

④ **Zoom**
C'est un objectif f17~102mm utilisant la monture C standard F2,0.

⑤ **Commutateur marche/arrêt**
(Pour enregistreur à vidéocassettes VHS National Panasonic)
Ce commutateur sert à la mise en marche et à l'arrêt de l'enregistreur. Enfoncez le bouton REC de l'enregistreur. Poussez une fois sur le commutateur Marche/Arrêt pour l'enregistrement, appuyez à nouveau pour la pause. La lampe de signalistation s'allume lorsque l'enregistrement est en cours.
Ce commutateur n'est utile que lorsque le contrôle à distance ou le câble caméra est effectivement branché sur l'enregistreur à vidéocassettes VHS.

⑥ **Trous filetés pour trépied**
Ces trous filetés sont utilisés lors du montage de la caméra sur un trépied.

⑦ **Dragonne**

⑧ **Câble de lacaméra et connecteur**
Ce câble est branché sur la prise d'entrée caméra de l'unité de réglage.
Ce câble doit être connecté à l'unité de réglage pour que la caméra fonctionne, étant donné qu'il sert au transport d'énergie qui lui est nécessaire et qu'il est également utilisé comme vecteur d'information d'image, de la caméra vers l'unité de réglage. Cette information d'image, de la caméra vers l'enregistreur vidéo.

⑨ **Commutateur de sélection pour la balance du blanc (WHITE BALANCE)**
Positionnez le commutateur en fonction de la source lumineuse éclairant la scène à filmer.

⑩ **Régulateur d'intensité pour le rounge (R)**
Si l'image apparaít rougeatre sur l'écran, tournez ce bouton de commande légèrement en sens inverse des aiguilles d'une montre.

⑪ **Régulateur d'intensité pour le bleu (B)**
Si l'image apparaít bleuâtre sur lècran, tournez ce bouton de commande légèrement en sens inverse des aiguilles d'une montre.

⑫ **Commutateur MARCHE/ARRET (POWER ON/OFF).**

⑬ **Indicateur de puissance**
Cet indicateur s'allume chaque fois que l'unité de réglage est sous tension, pour vous avertir du fonctionnement de cette unité de réglage.

⑭ **Prise d'entrée caméra**
Le câble venant de la caméra se fixe ici an utilisant le connecteur de câble caméra. La caméra est alimentée via ce câble et c'est par ce câble qu'elle envoie aussi l'information sonore et d'image vers l'unité de réglage. Assurez-vours que le connecteur de câble est correctement enfiché dans la prise.

⑮ **Connecteur de l'adaptateur caméra AC**
A connecter sur l'adaptateur caméra AC (WV-3303E).

① **Elektronische zoeker**
Dit is een kleine 3,5cm TV nomitor die het beeld weergeeft, dat de lens ziet.

② **Oogkap**
Schermt omgevingslicht af en vergroot tijdens opname het beeld.

③ **Microfoon**
Dit is de ingang van de ingebouwde microfoon. De microfoon is het gevoeligst voor geluid, dat komt uit de richting, waarin de kamera wijst.

④ **Zoomlens**
Dit is een f 17—102mm lens met standaard C vatting. F2,0.

⑤ **Start/stop schakelaar**
(Voor National Panasonic VHS video cassetterecorder).
Deze schakelaar wordt gebruikt om de recorder te starten en te laten pauzeren. Druk op de REC knop van de recorder. Druk eenmaal op de star/stop knop om op te nemen en nog eens om te pauzeren. Het contrôlelampje brandt tijdens opname. Deze schakellar werkt alleen wanneer de afstandbediening of de kamerakabel op de VHS videorecorder zijn aangesloten.

⑥ **Bevestigingsgaten voor het statief**
Deze gaten dienen om de kamera op het statief te bevestigen.

⑦ **Handlus**

⑧ **Kamerakabel en kabelaansluiting**
Deze kabel wordt op de kamera ingangsaansluiting van de CCU aangesloten. Deze kabel moet op de CCU worden aangesloten tijdens het gebruikt omdat, hij de kamera van stroom voorziet en wordt gebruikt om de video informatie van de kamera naar de CCU te brengen. Deze video informatie wordt dan doorgegeven aan de videorecorder.

⑨ **Witbalans selectorknop (WHITE BALANCE)**
Kies de stand overeenkomstig de lichtbron, die de op te nemen scène verlicht.

⑩ **Roodinstelling (R)**
Als het op het scherm vertoonde beeld te roodachtig is, deze knop iets antikloksgewijs draaien.

⑪ **Blauwinstelling (B)**
Wanneer het op het scherm vertoonde beeld te blauwachtig is, deze knop iets antikloksgewijs draaien.

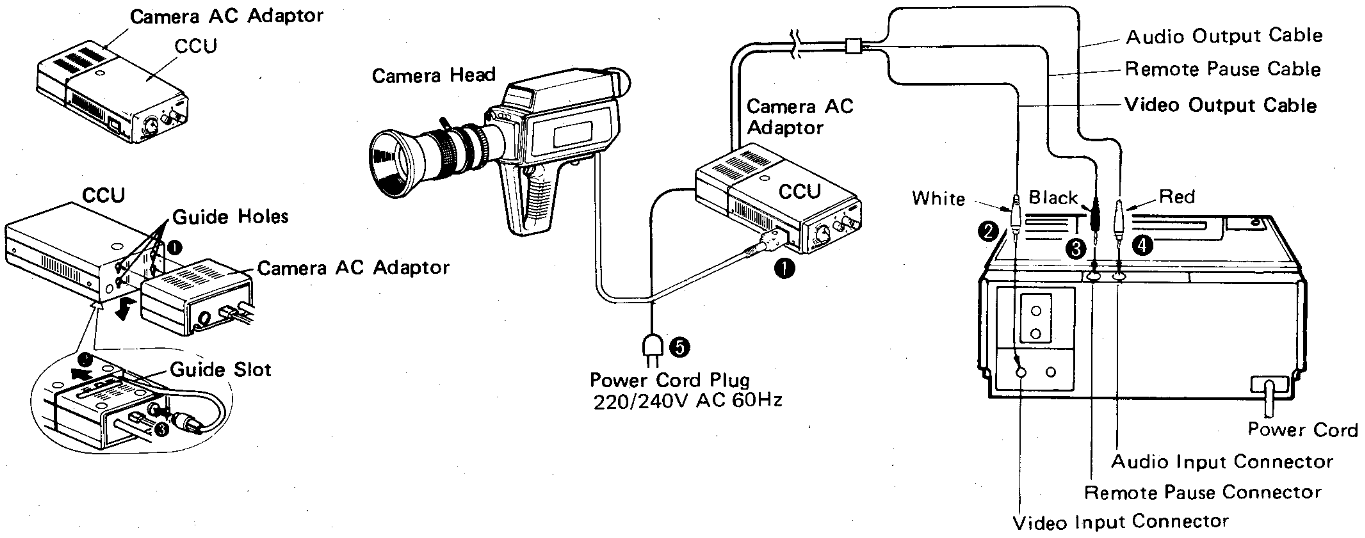
⑫ **Natschakelaar (POWER ON/OFF)**

⑬ **Netspannings indicator**
Dit lampje gaat telkens branden waneer de CCU is ingeschakeld om U te laten weten, dat de CCU werkt.

⑭ **Kamera ingangs aansluiting**
De kabel van de kamera wordt hier aangesloten met de kamera kabelplug. De kamera wordt via deze kabel van stroom voorzien en geeft verder beeld en geluid door naar de CCU. Zorg, dat de kabel stevig op de ingang is aangesloten.

⑮ **Wisselstroom adaptor kamera-aansluiting**
Aansluiten op de wisselstroom kamera adaptor (WV-3303 E).

HOW TO CONNECT TO A VIDEO TAPE RECORDER


Camera AC Adaptor
CCU
CCU
Guide Holes
❶
Camera AC Adaptor
❷
Guide Slot
❸
Camera Head
Camera AC Adaptor
CCU
❶
❺
Power Cord Plug
220/240V AC 60Hz
Audio Output Cable
Remote Pause Cable
Video Output Cable
White
Black
Red
❷
❸
❹
Power Cord
Audio Input Connector
Remote Pause Connector
Video Input Connector

> CAUTION:
> - Keep the CCU power OFF during connection.
> - Turn the ON/OFF Switch ON only after connecting the camera cable.

- The Camera must be used with the Camera AC Adaptor
- Also refer to the recorder's operating instructions when using a National Panasonic VHS video tape recorder.

■ Installation

Install the Camera AC Adaptor to CCU as shown.

❶ Hook the Camera AC Adaptor into guide holes of the CCU and push down until the cases are flush.

❷ Fix them with slide lock knob on the bottom of the Camera AC adaptor

❸ Push the cable into the guide slot and plug in the connectors,

■ Connections

❶ Plug the Camera Cable into Camera Input Connector of CCU. The connector is polarized and will only fit one way. Squeeze the releases to unplug.

❷ Connect video output connector to video input jack of VTR.

❸ Connect audio output connector to audio input jack of VTR.

❹ Connect remote pause connector to remote control jack of VTR.

❺ Connect the power cord plug to a 220/240V AC power source. Keep the power switch turned OFF during connection.

ANSCHLUB DER KAMERA AN VIDEORECORDER

> ACHTUNG: ● Während der Anschlußarbeiten Kontrolleinheit ausschalten!
> ● Netzschalter (ON/OFF) erst nach Anschließen des Kamerakabels einschalten!

- Die Kamera muß mit dem Kamera-Netzadapter benutzt werden.
- Beachten Sie auch die Bedienungsanleitung beim Gebrauch eines National Panasonic VHS-Farb-Videorecorders.

■ Aufbauhinweise

Kamera-Netzadapter lt. Abbildung an Kontrolleinhiet anschließen.

❶ Netzadapter in die Führungen der Kontrolleinheit einführen und herunterdrücken, bis beide Geräte eine Ebene bilden.

❷ Die Geräte mit dem Schiebeknopf auf der Oberseite des Netzadapters arretieren.

❸ Kabel in die Führungsnut drücken und Stecker anschließen.

■ Anchlußhinweise

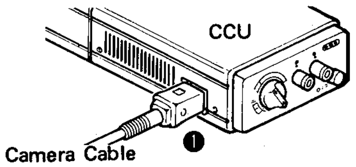
❶ Kamerakabel am Kameraeingang der Kontroleinheit anschließen.
Der Anschluß ist gepolt, kann aber nur in einer Richtung erfolgen (Verpolugsschuts). Zum Entfernen des Steckers müssen die Rasten gedrückt werden.

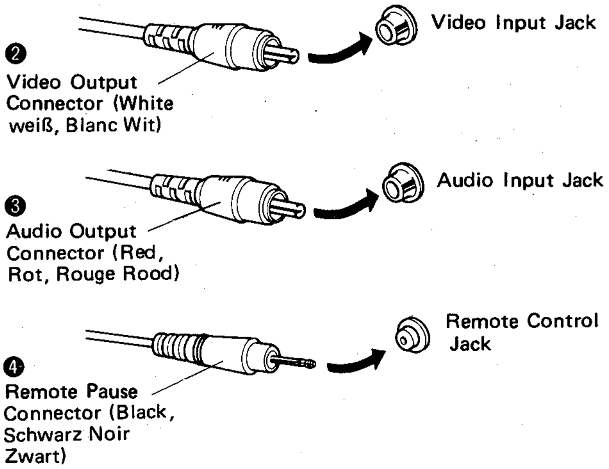
❷ Stecker Video-Ausgang an Buchse Videoeingang am Recorder anschließen.

❸ Stecker Ton-Auspang an Buchse Toneingang am Recorder anschließen.

❹ Stecker Schnellstop-Fernbedienung an Buchse Fernbedienung am Recorder anschließen.

❺ Netzkablel an eine 220/240 V AC-Stromquelle anschließen. Gerät erst einschalten, wenn das Netzkabel eingeführt ist.




❷
Video Output Connector (White weiß, Blanc Wit)
Video Input Jack
❸
Audio Output Connector (Red, Rot, Rouge Rood)
Audio Input Jack
❹
Remote Pause Connector (Black, Schwarz Noir Zwart)
Remote Control Jack

PROCEDURE DE CONNEXION A UN ENREIGISTREUR VIDEO

PRECAUTION:

- Maintenez l'unité de réglage en position ARRET au moment du branchement.
- Ne placez le commutateur MARCHE/ARRETET en position MARCHE (OFF ▐▌) qu'au moment ou le câble caméra est connecté.

- La caméra doit être utilisée avec l'adaptateur caméra AC.
- Référez-vous également aux instructions relatives au fonctionnement de l'enregistreur lorsque vous employez un enregistreur lorsque vous employez un enregistreur vidéo couleur VHS National Panasonic.

■ **Installation**

Placez l'adaptateur caméra AC contre l'unité de réglage, comme décrit sur l'illustration.

❶ Accrochez l'adaptateur caméra AC dans les trous de guidage de l'unité de réglage et exercez une pression jusqu'à ce que les boîtiers soient encastrés.
❷ Fixez-les avec des fixations à glissiéres, sur le fond de l'adaptateur caméra AC.
❸ Enfoncez le câble dans la rainure de guidage et enfichez le connecteur.

■ **Connexions**

❶ Enfichez le câble caméra dans le connecteur d'entrée caméra de l'unité de réglage. Le connecteur est polarisé et ne peut être monté que d'une seule facon. Exercez une pression sur les loquets pour libérer la prise.
❷ Branchez le connecteur de sortie image sur le jack d'entrée image de l'enregistreur vidéo.
❸ Branchez le connecteur de sortie son sur le jack d'entrée son de l'enregistreur vidéo.
❹ Branchez le connecteur de pause à distance sur le jack de commande à distance de l'enregistreur vidèo.
❺ Branchez la fiche du cordon d'alimentation sur une source de courant 220/240V CA. Maintenez le commutateur d'alimentation en position ARRET pendant les opérations de connexion.

AANSLUITING OP EEN VIDEO TAPERECORDER

OPGELET:

- Laat tijdens het aansluiten de CCU uitgeschakeld (off).
- Schakel de netschakelaar pas in (on) nadat de kamerakabel is aangesloten.

- De kamera moet worden gebruikt met de kamera wisselstroom adaptor.
- Zie verder de handleiding van de recorder bij gebruik van een National Panasonic VHS kleuren videorecorder.

■ **Installatie**

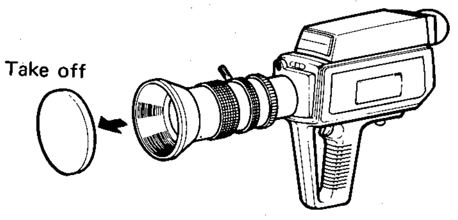
Installeer de kamera netadaptor zoals aangegeven op de CCU.

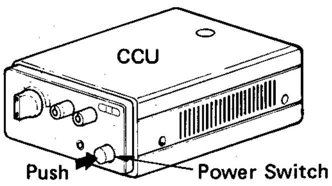
❶ Schuif de kamera netadaptor in de geleidegaten van de CCU en druk beide stevig tegen alkaar tot ze goed aansluiten.
❷ Vergrendel ze met de schuifknop op de onderkant van de adaptor.
❸ Steek de kabel in de ingang.

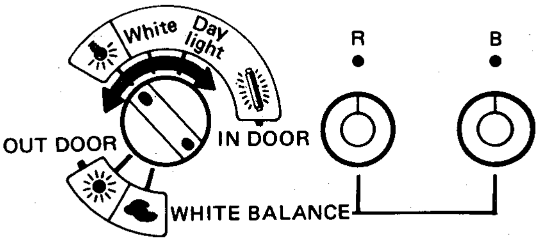
■ **Aansluitingen**

❶ Sluit de kamerakabel aan op de kamera ingangsaansluiting van de CCU. De aansluiting is gepolariseerd en past slechts op één manier. Druk de vergrendeling in om hem weer los te maken.
❷ Sluit de video uitgang aan op de video ingang van de VTR.
❸ Sluit de audio uitgang aan op de audio ingang van de VTR.
❹ Sluit de afstandsbediening aan op de overeenkomstige VTR ingang.
❺ Sluit het netsnoer aan op een 220/240V wisselstroom stopcontact. Zorg dat de netschakelaar tijdens het aansluiten uit staat.

OPERATING PROCEDURE







1. Make all required connections.
2. Remove the lens cap.
3. Turn the CCU, recorder and TV (monitor) on. Set the recorder in RECORD Mode.
4. Set the white balance selector in the position which corresponds to appropriate lighting condition.
5. Turn the iris ring until the center lamp of the light intensity indicator lamps is illuminated.
6. Turn the focus ring to get the best focus by estimating camera to subject distance or by watching the picture in the viewfinder screen.

   Move the "zoom" lever for the maximum close-up. Set focus for sharpest picture. Focus will now track for the range of the zoom.
7. Adjust the red and blue gain controls to get the best colour rendition on a properly adjusted colour monitors, or place them in the center (detent) position.
8. Squeeze the start/stop switch on the camera. The tally lamp will light as the recorder begins to record.
9. Squeeze the start/stop switch to stop the recorder at any time. Squeeze the switch again to resume recording.
10. When the recording is finished and playback is desired, depress STOP on the recorder. Then rewind the tape to the begining of the recording and proceed to paly back.
11. Do not aim the camera at bright objects, as the pick-up tube may be damaged. Also keep the microphone away from loud sounds (such as the speaker of the TV), since howling noise (feedback) may occur.

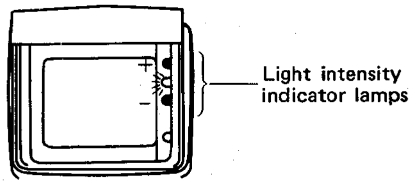
Note: When the Remote Control Cable is connected between the Camera AC Adaptor and the VHS recorder, the camera trigger acts as a remote Start/Stop control. Should the recorder remain in the STOP mode when the PLAY button is depressed, it means that the last command it received was to STOP. Simply trigger the camera or remove the Remote Control Cable for normal operation.

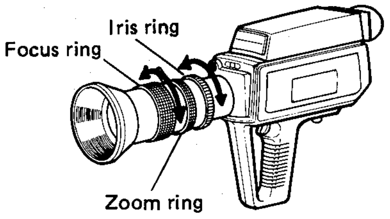
BEDIENUNGSHINWEISE

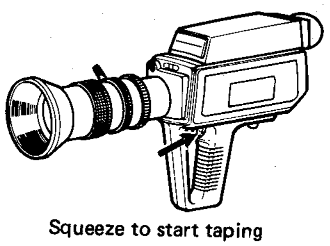
1. Alle erforderlichen Verbindungen herstellen.
2. Objektiv-Schutzkappe abnehmen.
3. Kontrolleinheit, Recorder und Fernsehmonitor einschalten. Recorder auf Aufnahme schalten.
4. Weiß ableich-Schalter entsprechend den Beleuchtungsverhältnissen einstllen.
5. Blendenring so drehen, daß die mittlere Lichtstärkeanzeige brennt.
6. Schätzen Sie die Entfernung Kamera zu Aufnahmegegenstand oder stellen Sie mit dem Schärfering während der Aufnahme auf optimale Bildschärfe auf dem Sucherbildschirm ein.

   Holen Sie das Aufnahmeobjekt mit Hilfe des Zoomobjektivs nah heran. Bild auf maximale Schärfe einstellen. Jetzt bleibt das Bild über den gesamten Fahrbereich des Zoomobjektivs scharf.
7. Rot- und Blau-Verstäkungsregler auf beste Farbwiedergabe auf einem sauber justierten Farbmonitor einstellen oder beide Regler in Mittelstellung (Raststellung) bringen.
8. Start/Stop-Schalter (Auslöser) an der Kamera drücken. Sobald der Recorder mit der Aufnahme beginnt, leuchtet die Aufnahmekontrolle.
9. Durch Drücken des Start/Stop-Schalters kann der Recorder zu jeder Zeit angehalten werden. Durch nochmaliges Drücken dieses Schalters geht die Aufnahme weiter.
10. Soll die Aufnahme nach Aufzeichnung wiedergegeben werden, betätigt man den Stop-Schalter am Recorder, spult das Band an den Beginn der aufnahme zuruck und startet die Wiedergabe.
11. Kamera nie auf zu helle Objekte richten, da sonst die Aufnahmeröhre dadurch beschädigt werden könnte. Das Mikrofon sollte man auch nicht zu nahe an laute Tonquellen bringen, da sonst Rüuckkopplungspfeieen (z. B. durch den Monitorlautsprecher) auftreten könnte.

Hinweis: Ist zwischen Kamera-Netzadapter und VHS-Videorecorder das Fernsteuerkabel angeschlossen, wirkt der Kamera-Auslöser als Start/Stop-Fernsteuerung. Sollte der Recorder nach Drücken der Wiedergabetaste nicht anlaufen, beduetet dies, daß der Recorder als letzten Befehl das Stopsignal erhalten hatte. In einem solchen Fall drücket man den Auslöser nochmals oder man entfernt das Fersteuerkable zum Normalbetrieb.







MARCHE A SUIVRE

1. Etabissez toutes les connexions requises.
2. Enlevez le cache de l'objectif.
3. Mettez en marche l'unité de réglage, l'enregistreur et la TV (montieur). Placez l'enregistreur en position REOCRD .
4. Placez le sélecteur de balance du blanc dans la position correspondant aux conditions d'éclairement appropirées.
5. Tournez la bague de réglage du diaphragme jusqu'à ce que la lampe centrale de l'indicateur de sur/sous-exposition s'allume.
6. Tourner la bague de mise au point pour obtenir la meilleure focalisation, en estimant la distance séparant la caméra du du sujet à filmer ou en observant l'image apparaissant sur l'écran du viseur.
   Actionnez le levier du zoom pour obtenir l'obturation maximale. Régler la focalisation pour un maximum de netteté de l'image. La focalisation s'accorde alors avec la portée du zoom.
7. Ajustez les régulateurs d'intensité pour le rouge et le bleu pour obtenir une reproduction optimale des couleurs sur un moniteur couleur correctement réglé, ou fixez-les en position centrale (butée).
8. Enforcez le commutateur marche/arrêt de la caméra. La lampe de signalisation s'allumera au moment où l'enregistreur commencera à enregistrer.
9. Enfoncez le commutateur marche/arrêt pour arrêter l'enregistreur, lorsque vous le désirez. Pour reprendre l'enregistrement, enfoncez à nouveau le commutateur.
10. Une fois que l'enregistrement est terminé et que vous désirez une lecture, enfoncez le bouton STOP de l'enregistreur. Rebobinez alors la bande et jusqu'au début de l'enregistrement et procédez à la restitution de l'enregistrement.
11. Ne pointez pas la caméra dans la direction d'objets dégageant une vive lumiere, pour éviter tout dommage au tube de prise de vues. Il convient également que vous teniez le microphone à l'écart de sons bruyants (le présentateur de la TV par exemple), pour éviter la production de bruits stridents (feedback).

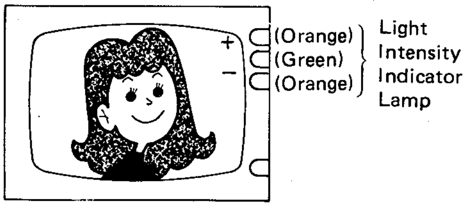
Remarque: Lorsque le câble de commande à distance est connecté entre l'adaptateur caméra AC et l'enregistreur VHS le déclencheur de la caméra fonctionne en tant que commande MARCHE/ARRET à distance. Si l'enregistreur restait en position STOP alors que le bouton PLAY est enfoncé, cela voudrait dire que le dernier ordre recu était de STOPPER. Pour obtenir alors un fonctionnement normal, déclenchez la caméra ou enlevez le câble de commande à distance.

HANDLEIDING

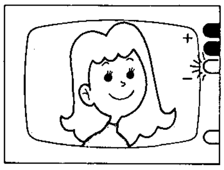
1. Maak de noodzakelijke aansluitingen.
2. Neem de lensdop weg
3. Schakel de CCU, de recorder en de TV (monitor) in. Zet de recorder in stand opname (RECORD)
4. Zet de witbalans selector in de stand, die overeenkomt met de heersende lichtomstandigheden
5. Draai de diafragmaring totdtat het middelste lampje van de lichtsterkte indicator brandt.
6. Draai de diafragmaring om scherpstelling te krijgen door het schatten van de afstand tussen kamera en voorwerp of door het beeld op het zoekerscherm te bekijken.
   Beweeg de "zoom" hefboom voor maximale close-up. Stel het diafragma in voor het scherpste beeld. De scherpte is nu juist voor het zoombereik.
7. Regel de rood- en blauwinstelling zodanig af, dat U de beste kleurweergave verkrijgt op een goed afgeregelde kleurenmonitor, of zet ze in de middenstand.
8. Druk de star/stop knop op de kamera in. Het contrôlelampje gaat branden als de recorder begint op te nemen.
9. Druk de start/stop knop in om de kamera op elk gewenst moment te stoppen. Opnieuw indrukken om de opname te hervatten.
10. Wanneer de opname klaar is en men wil weergeven de STOP knop op de recorder indrukken. Dan de band terugspoelen tot het begin van de opname en met weergave beginnen.
11. Richt de kamera niet op heldere voorwerpen, omdat de opnamebuis dan kan worden beschadigd. Houdt de microfoon ook uit de buurt van krachtige geluidsbronnen (zoals de TV luidspreker) omdat dan gillen (terugkoppeling) mogelijk is.

Opm.: Wanneer de afstandbedieningskabel tussen de kamera netadaptor en de VHS recorder is aangesloten, werkt de kameraknop als een start/knop afstandbediening. Wanneer de recorder nadat de PLAY knop wordt ingedrukt niet start, betekent dit, dat hij als laatste opdracht STOP kreeg. Gebruik gewoon de kameraknop of verwijder de afstandbediening voor gewoon gebruik.

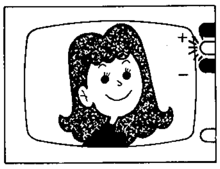
ADJUSTMENTS

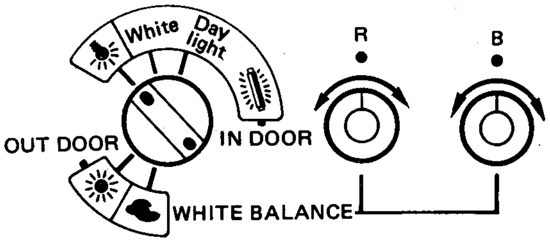


- Illumination too low. Open the lens iris or provide more illumination.



- Proper iris setting position.





Iris Control of the Lens

When adjusting the lens iris, watch the light intensity indicator lamps on the viewfinder, and leave it in the position where the center lamp comes to light.

White Balance Selector

Select the white balance selector according to the light source used.

Red and Blue Gain Controls

After selecting the colour temperature using the White Balance Selector, adjust the red and blue gain controls get the best colour rendition, if required. Each control has been preset as its detent position by the factory to provide standard gains. Use only properly adjusted colour monitor if resetting them.

- If the picture on the screen appears reddish, turn the red gain control slightly counter-clockwise. If the picture appears to be lacking in red, turn the red gain slightly clockwise.
- If the picture on the screen appears blueish, turn the blue gain control slightly counter-clockwise. If the picture appears to be lacking in blue, turn the blue gain slightly clockwise.
- The careful adjustment of both controls may be required to achieve proper colour balance.
- If in doubt, use the detent positions.

EINSTELLARBEITEN

Blendenregelung am Objektiv

Die Objektivblende wird unter Beobachtung der Lichtstärke-Anzeige-Lampen am Sucher so eingestellt, daß die mittlere Lampe brennt und in dieser Stellung belassen.

Weißabgleich-Schalter

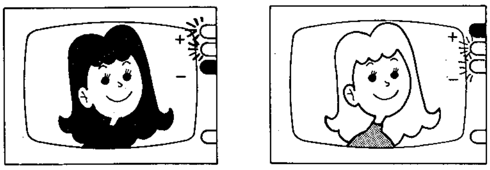
Stellen Sie diesen Schalter der Lichtquelle entsprechend ein.

Rot- und Blau-Verstärkungsregler

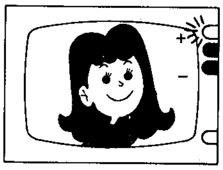
Nach Einstellung der richtigen Farbtemperatur mit dem Weißabgleich-Schalter stellt man die Rot- und Blau-Verstärkungsregler auf beste Farbwiedergabe ein, falls erforderlich. Beide Regler wurden in ihrer Mittelstellugn (Raststellung) im Werk bereits auf normale Verstärkung einjustiert. Zum Nachregulieren muß unbedingt ein sauber justierter Farbmonitor zur Verfügung stehen.

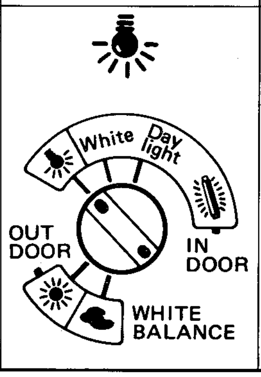
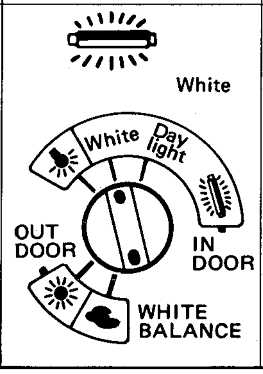
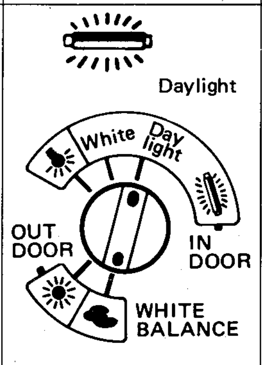
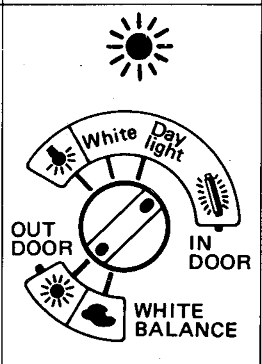
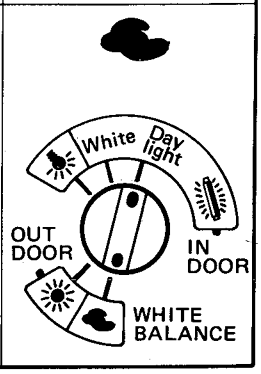
- Hat das Bild auf dem Bildschirm einen Rotstich, wird der Rot-Verstärkungsregler vorsichtig entgegen dem Uhrzeigersinn gedreht. Fehlen anscheinend im Bild die Rotanteile, wird dieser Regler im Uhrzeigersinn vorsichtig gedreht.
- Hat das Bild auf dem Bildschirm einen Blaustich, wird der Blau-Verstärkungsregler vorsichtig entgegen dem Uhrzeigersinn gedreht. Fehlen anscheinend im Bild die Blauanteile, wird dieser Regler im Uhrzeigersinn vorsichtig gedreht.
- Durch sorgfältige Einstellung beider Regler wird ein sauberer Farbabgleich erreicht.
- Sollten beim Farbabgleich Unsicherheiten auftreten, läßt man die Regler besser in der Mittenstellung (Raststellung).

- Usable iris setting range.



- Illumination too high. Close the lens iris or use the neutral density (ND) filler.



	INDOOR			OUTDOOR	
CONDITION	Halogen Lamp Tungsten Lamp	Fluorescent Lamp (WHITE)	Fluorescent Lamp (DAYLIGHT)	Daylight	Cloudy
SET POSITION		White 	Daylight 		

REGLAGES

Contrôle du diaphragme iris

Pour régler l'iris de la lentille, regardez les lampes indicatrices de l'exposition aménagées dans le viseur et laissez la bague de réglage dans la position correspondant à l'éclairement de la lampe centrale.

Sélecteur de balance du blanc

Positionnez le sélecteur de balance du blanc en fonction de la source lumineuse utilisée.

Régulateur d'intensité pour le rouge et le bleu

Après avoir sélectionné la température de couleur au moyen du sélecteur de balance de blanc, positionnez les régulateurs d'intensité pour le rouge et le bleu afin d'obtenir la meilleure reproduction des couleurs. Chaque commande a fait l'objet d'un prépositionnement en usine de sorte qu'une position d'arrêt assure une intensité standard. Lorsque vous décidez d'effectuer une mise au point personnelle, veillez à utiliser un moniteur couleur parfaitement réglé.

- Si l'image semble rougeâtre sur l'écran, faites pivoter le régulateur d'intensité du rouge légèrement en sens inverse des aiguilles d'une montre.
  Si l'image semble manquer de rouge, tournez ce même bouton légèrement dans les sens des aiguilles d'une montre.
- Si l'image semble bleuâtre sur l'écran, faites pivoter le régulateur d'intensité du bleu légèrement en sens inverse des aiguilles d'une montre.
  Si, au contraire, l'image semble manquer de bleu, tournez ce même bouton légèrement dans le sens des aiguilles d'une montre.
- Il est necessaire que ces deux réglages soientcorrectement effecteus pour obtenir un équilibrage correct des couleurs.
- En cas de doute, utilisez les positions standard.

INSTELLINGEN

Diafragma instelling van de lens

Kijk tijdens het afregelen van het diafragma naar de lichtsterkte indicatielampjes in de zoeker en kies de instelling, waarbij het middelste lampje brandt.

Witbalans selector

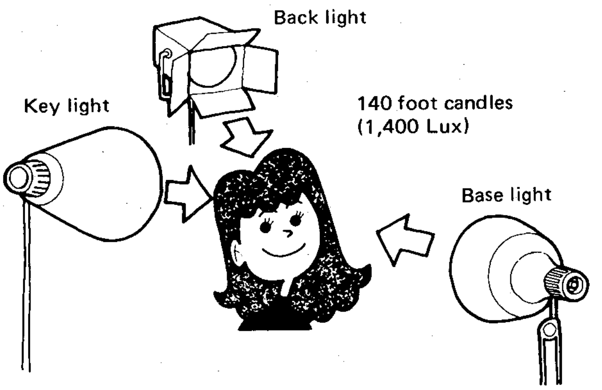
Stel deze selector in overeenkomstig de gebruikte lichtbron.

Rood-en blauwinstelling

Nadat de juiste kleurtenperatuur is ingesteld met de witbalans selector moet de rood- en blauwinstelling gebeuren om optimale kleurweergave to krijgen als zulks nodig is. Elke knop is op de fabriek al vooringesteld om een standaard regelbereik te verkrijgen. Gebruik uitsluitend een goed ingestelde kleurenmonitor om ze bij te regelen.

- Wanneer het beeld op het scherm roodachtig is, moet de knop voor de roodinstelling iets antikloksgewijs worden gedraaid. Als het beeld to weinig rood bevat, moet hij iets kloksgewijs worden gedraaid.
- Wanneer het beeld blauwachtig lijkt, miet de blauwinstellingsknop iets antikloksgewijs worden gedraaid. Wanneer het beeld te arm is aan blauw daarentegen iets kloksgewijs.
- Zorgvuldige afregeling van beide knoppen kan nodig zijn om een goede kleurbalans te krijgen.
- Wanneer U twijfelt, gebruik dan de middenstand

TO PRODUCE THE BEST COLOUR VIDEO PROGRAM



The WV-3300E has been designed for normal scene illumination of 140 footcandles (1,400 lux) at F4.0.
Illumination does not mean the light intensity of the light source, but the brightness of the scene where the object is located. An illumination of 140 foot candles (1,400 lux) is standard, but the camera may be used at F2.0, if illumination is more than 10 footcandle (100 lux). In places where illumination exceeds 1,000 footcandles (10,000 lux), an ND filter (provided) must be used.

Lighting

Indoor-Lighting:

- Object illumination: Approx. 140 footcandles (1,400 lux).
- Keep sufficient distance between the lights and the object to get uniform illumination.
- Maintain as much brightness as possible behind the object.
- Minimize object shadows.

There are the fundamentals for reducing the contrast ratio. To emphasize a three-dimensional effect or to add depth, use additional spot lights.

Front Light and Back Light

When using your camera outdoors, use it preferably with the sun behind you. Using your camera with the sun in front of you not only makes for difficult aperture ring adjustment, but creates a video signal with too much contrast and subduced colour. If possible, zoom in on your object to fill the screen. Following these simple steps assures that your camera will produce natural colour programs.

TIPS ZUR AUFNAHME EINES MÖGLICHST GUTEN VIDEO-FARBPROGRAMMS

Die WV-3300E ist für eine normale Szenenbeleuchtung von 140 footcandles (1400 lux) bei Blende f/4 ausgelegt. Der Begriff Beleuchtung heißt in diesem Falle nicht Lichtstärke der Lichtquelle sondern Gesamthelligkeit der Aufnahmeszene. Die Normalbeleuchtung beträgt 140 footcandles (1400 lux), die Kamera arbeitet aber mit Blende f/2 auch noch bei einer Beleuchtung über 10 footcandles (100 lux). Beträgt die Beleuchtung über 1.000 footcandles (10.000 lux), so muß das mitgelieferte Graufilter benutzt werden.

Beleuchtung

Innenbeleuchtung:

- Beleuchtung des Objekts ca. 140 footcandles (1,400 lux)
- Zum Erzielen einer gleichmäßigen ausleuchtung muß für ausreichenden Abstand zwischen Lichtquelle und Aufnahmeobjekt gesorgt werden.
- Hiter dem Objekt soviel Helligkeit als möglich lassen.
- Objektschatten möglichst vermeiden.

Dies sind die Grundsätze zur Verringerung des Kontrastverhältnisses. Zum Betonen eines dreidimensioalen Effekts oder um die Tiefe zu vergrößern werden zusätzliche Punktstrahler benutzt.

Vorderlicht und Hinterlicht

Bei Außenaufnahmen sollte man das Sonnenlicht vorzugsweise im Rücken haben. Wird die Kamera mit dem Sonnenlicht von vorne benutzt, treten nicht nur Schwierigkeiten bei der Blendeneinstellung auf, sondern das Videosignal wird auch zu kontrastreich und die Farben zu flau. Falls möglich sollte mit Hilfe des Zoom-Objektivs das Objekt möglichst bildschirmfüllend herangeholt werden. Bei Befolgung dieser einfachen Tips müßten Sie mit Ihrer Kamera natürliche Farbprogramme herstellen können.

COMMENT PRODUIRE LE MEILLEUR PROGRAMME VIDEO COULEURS

La WV-3300E a été concue pour un éclairage de la scèce normal de 1400 lux à F4,0.

Par éclairage, on n'entend pas l'intensité de la source lumineuse mais bien la luminosité de la scène où se trouve le sujet à filmer. Un éclairement de 1.400 lux peut être considéré comme une valeur standard mais la caméra peut tout aussi bien être utilisée avec une ouverture à F2,0, lorsque l'éclairement est supérieur à 100 lux. Dans les endroits où l'éclairement dépasse 10.000 lux, il y a lieu d'utiliser le filtre non-sélectif (livré).

Eclairage

Eclairage intérieur

- Eclairage du sujet: Environ 1,400 lux.
- Maintenez une distance suffisante entre les lumières et le sujet afin d'assurer un bonne uniformité de l'éclairement.
- Faites en sorte que le sujet se détache sur un fond aussi lumineux que possible.
- Limitez les ombres autour du sujet à filmer.

Ce sont lá les régles fondamentales à observer pour limiter le rapport des contrastes. Pour accentuer un effet tridimensionnel ou pour ajouter de la profondeur à la scéne filmée, utilisez des spots limineux.

Lumiére directe et contre-jour

Lorsque vous opérez à l'extérieur avec votre caméra, faites le autant que possible avec le soleil dans le dos. Le fait d'utiliser votre caméra face au soleil rend non seulement difficile la mise au point du diaphragme, mais occasionne également un signal vidéo trop contrasté et des couleurs atténuées. Si c'est possible, faites varier la distance focale de façon à remplir l'écran avec votre sujet. Suivre ces quelques conseils, c'est être assuré que votre caméra produira des programmes aux couleurs naturelles.

HET PRODUCEREN VAN HET BESTE VIDEO KLEURENPROGRAMMA

De WV-3300E is ontworpen voor een normale scèneverlichting van 1400 lux bij F 4,0. Verlichting betekent niet de lichtintensiteit van de lichtbron, maar de helderheid van het tafereel waar het voorwerp staat. Een verlichting van 1400 lux is standaard, maar de kamera kan worden gebruikt bij F 2,0 wanneer de verlichting meer dan 100 lux bedraagt. Op plaatsen, waar de verlichting de 10,000 lux te boven gaat, moet het (meegeleverde) ND filter worden gebruikt.

Belichting

Binnen belichting

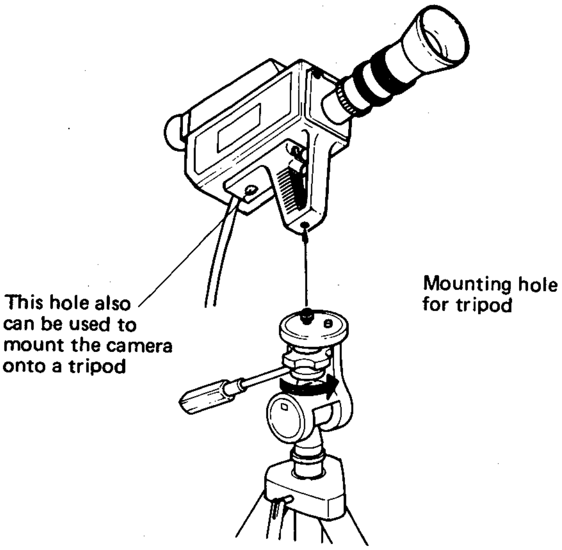
- Voorwerpverlichting: ca. 1,400 lux
- Houd voldoende afstand tussen de lampen en het onderwerp om een gelijkmatige belichting te krijgen.
- Zorg voor een zo groot mogelijke helderheid achter het voorwerp.
- Vermijd zoveel mogelijk schaduwen van het voorwerp.

Dit zijn de fundamentele regels om de contrastverhouding te verkleinen. Om een driedimensionaal effekt te accentueren of om diepte toe te voegen extra spotlicht gebruiken.

Licht voor en achter

Wanneer U de kamera buiten gebruikt, houd dan de zon liefst achter U. Wanneer de zon voor U staat is het niet alleen moeilijk om het diafragma in te stellen, maar ontstaat ook een beeld met teveel contrast en getemperde kleuren. Zo mogelijk op het onderwerp inzoomen om het scherm te vullen. Het opvolgen van deze eenvoudige stappen garandeert, dat Uw kamera natuurlijke kleurenprogramma's produceert.

MOUNTING THE CAMERA ON A TRIPOD


This hole also can be used to mount the camera onto a tripod
Mounting hole for tripod

- The camera may be attached to your tripod when you wish to make a long recording without holding the camera with your hands, or if you want to keep the camera very steady while recording.

> - Be sure that the camera is securely fastened.
> - Be sure that the tripod is sturdy enough to hold the camera.

KAMERABEFESTIGUNG AUF EINEM STATIV

- Wollen Sie eine sehr lange Aufnahme machen, ohne die Kamera in der Hand halten zu müssen ode soll die Kamera sehr ruhig (ohne Verwackeln) geführt werden, kann sie auf ein Stativ montiert werden.

> - Überzeugen Sie sich, daß die Kamera fest auf das Stativ montiert ist.
> - Vergewissern Sie sich, daß das Stativ für diese Kamera auch stabil genug ist.

MONTAGE DE LA CAMERA SUR TREPIED

Il est possible de fixer la caméra sur un trépied lorsque vous désirez effectuer un enregistrement de longue durée sans tenir la caméra dans vos mains, ou quand vous désirez que la caméra ait une position très stable durant l'enregistrement.

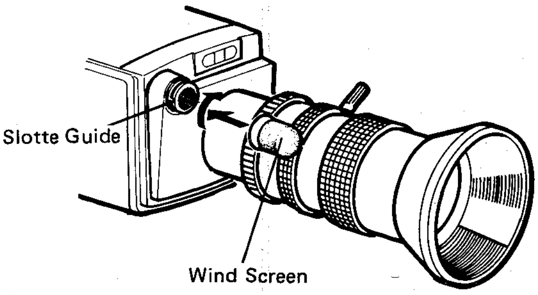
> - Assurez-vous que la caméra est correctement fixée.
> - Assurez-vous que le trépied est suffisamment robuste pour supporter le poids de la caméra.

BEVESTIGING VAN DE KAMERA OP EEN STATIEF

- Wanneer U wilt kan de kamera op een statief worden bevestigd tijdens het maken van een lange opname, waarbij U hem niet in de hand wilt blijven houden of wanneer U de kamera tijdens opname erg stil wilt houden.

> - Zorg dat de kamera stevig is bevestigd.
> - Zorg, dat het statief stevig genoeg is om de kamera te dragen

USING THE WIND SCREEN



- The wind screen is supplied so that it may be used in cases where wind may be a problem.
- Attach the wind screen on the microphone as shown.

VERWENDUNG DES WINDSCHIRMS

- Der Windschirm wird mitgeliefert zzr Verwendung in Fällen, wo der Wind die Aufzeichnung beeinflussen könnte.
- Den Windschirm wie in der Abbildung gezeigt auf das Mikrofon aufsetzen.

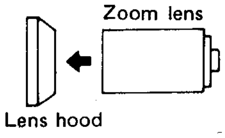
PARAVENT

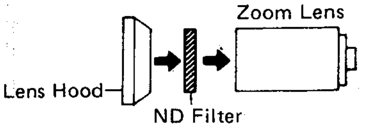
- Le paravent s'utilise dans les cas où le vent fait problème.
- Monter le paravent sur le micro comme illustré ci-dessous.

GEBRUIK VAN HET WINDSCHERM

- Het windscherm is bijgevoegd, zodat het kan worden gebruikt onder omstandigheden waar de wind een probleem kan vormen.
- Bevestig het windscherm op de microfoon zoals in de tekening is getoond.

USING THE ND FILTER





- When using the camera in a very bright place, be sure to use the ND filter.
  1. Remove the lens food.
  2. Screw the ND filter into the zoom lens.
  3. Mount the lens hood.

SPECIFICATIONS

Pick-up System:	Frequency separation system using a single vidicon
Pick-up Tube:	One 1" integrated, stripe filter electrostatic focusing, magnetic deflection, separate mesh vidicon tube, type S4089P.
Synchronizing System:	Internal sync: 625/50 fields/s (PAL)
Video Output:	1.0Vp-p/75 ohms, PAL composite x 1
Audio Output:	–20 dB/high impedance
Viewfinder:	1.5" electronic viewfinder with iris indicator Actual picture size 1-3/8", measured diagonally
Horizontal Resolution: (luminance signal)	250 lines at center
Illumination Required:	140 foot candle (1,400 lux) at F/4
Minimum Illumination:	10 foot candle (100 lux) at F/2
Signal-to-Noise Ratio:	45dB (luminance, 140 foot candle (1,400 lux) at F/4)
Maximum Cable Length:	76 ft (23m) between camera head and camera control unit
Lens:	6: 1 Zoon, 17mm ~ 102mm, F/2.0 (supplied)
Lens Mounting:	Standard C mount for 1" lens
Power Source:	220/240V ±10% AC Approx. 19W (with Camera AC Adaptor)
Ambient Operating Temperature:	0°C ~ +40°C
Ambient Operating Humidity:	Less than 90%
Dimensions:	Camera head: With Zoom Lens 90(W) x 233(H) x 431(D) mm CCU: without controls 116(W) x 65(H) x 200(D) mm
Weight:	Camera head: Approx. 2.5 kg CCU: Approx. 0.8 kg

TECHNISCHE DATEN

Aufnahme-System:	Frequenzabstandsystem mit nur einem Vidicon
Aufnahmerohre:	Ein 1"-Vidicon, Typ S4089P, mit integriertem Stripe-Filter, elektrostatischer Fokussierung, magnetischer Ablenkung, Separate-Mesh-Vidicon.
Synchronisation:	Intern synchronisiert 625 Zeilen/50 Halbbilder/sec. (PAL)
Video-Ausgang:	1 V_{SS}/75 Ohm, PAL-FBAS-Signal x 1
Ton-Ausgang:	-20 dB/hochohmig
Sucher:	Elektronischer 1,5"-Sucher mit Blendenanzeige Sofortbild-Sucher mit 1-3/8"-Diagonale
Horizontalauflösung: (Leuchtdichtesignal)	250 Zeilen in Bildmitte
Erforderliche Beleuchtung:	140 footcandles (1.400 lux) bei Blende f/4
Minimale Beleuchtung:	10 footcandles (100 lux) bei Blende f/2
Rauschabstand:	45 dB (Leuchtdichtesignal, 140 footcandles, 1.400 lux, bei Blende f/4)
Maximale Kabellänge:	76 ft (23 m) zwischen Kamerakopf und Kontrolleinheit
Objektiv:	6-fach Zoom, 17 bis 102 mm, Lichtstärke f/2 (normaler Lieferumfang)
Objektivbefestigung:	Normales C-Gewinde für 1"-Objektive
Stromversorgung:	220/240 V ± 10% AC, ca. 19W (mit Kamera-Netzadapter)
Umgebungstemperatur:	32°F ~ 104°F (0°C ~ +40°C)
rel. Luftleuchtigkeit:	unter 90%
Abmessungen:	Kamerakopf: Mit zoomobjektiv Breite 90 x Höhe 233 x Tiefe 431 mm Kontrolleinheit: ohne Bedienorgane Breite 116 x Höhe 65 x Tiefe 200 mm
Gewicht:	Kamerakopf: ca. 5-1/2 lbs (2,5 kg) Kontrolleinheit: ca. 1,8 lbs (0,8 kg)

CARACTERISTIQUES TECHNIQUES

Système de prise de vues:	Système à séparation de fréquences utilisant un seul vidicon.
Tube de prise de vues:	Un seul tube vidicon séparé à électrode maillée additionnelle, type S4089P, filtre à filets de 1", focalisation électrostatique, balayage électromagnétique.
Système de synchronisation:	Sync. interne: 625/50 trames/s (PAL)
Sortie video:	1.0Vp-p/75 ohms, composite PAL x 1
Sortie sonore:	-20dB/impédance élevée
Définition horizontale (signal de luminance):	250 lignes au centre
Viseur:	viseur électronique de 1,5" avec indicateur iris Format réel de l'image 1-3/8, mesuré diagonalement
Eclairement requis:	1400 lux à F/4
Eclairement minimun	100 lux à F/2
Rapport Signal/Bruit	45dB (luminance 1.400 lux à F/4)
Longueur max. du c	23m entre la caméra et l'unité de réglage
Objectif:	Zoom 6:1, 17mm ~ 102mm, F/2,0 (livré)
Monture Lentille:	Monture C standard pour lentille de 1"
Alimentation:	220/240V ± 10% CA approx. 19W (avec adapteur AC)
Température ambian	0°C ~ +40°C
Humidité ambiante:	Moins de 90%
Dimensions:	Caméra: avec zoom 90(L) x 233(H) x 431(P)mm Unité de réglage: sans commandes 116(L) x 65(H) x 200(P) mm
Poids:	Caméra: env. 2,5kg Un. Rég: env. 0.8 kg

SPECIFICATIES

Opnamesysteem:	Frekwentiescheidingssysteem met 1 enkele vidicon
Opnamebuis:	2,5cm geïntegreerde vidiconvuis type S4089 P met geïntegreerde strookfilter electrostatische scherpstelling, magnetische afbuiging en gescheiden netwerk
Synchronisatie systeem:	Inwendige synchronisatie 625/50 lijnen (PAL)
Video uitgang:	1,0V p-p/75 Ohm, PAL composiet x 1
Audio uitgang:	-20dB/hoge impedantie
Zoeker:	3,75cm electronische zoeker met diafragma indicatie effectief beeldformaat 3.5 cm, diagonaal gemeten
Horizontaal oplossend ver. mogen (luminantie sign.):	250 lijnen in het midden
Vereiste lichtskerkte:	1,400 lux bij F/4
Minimum lichtsterkte:	100 lux bij F/.2
S/R verhouding:	45dB (bij 1400 lux luminantie bij F/4)
Max. kabellengte:	23m tussen kamera en kamera stuureenheid
Lens:	6,1 zoomlens, 17mm–102mm, F/2,0 (bijgevoegd)
Lensvatting:	standaard C bevestiging voor 2,53cm lens
Stroomvoorziening:	220/240V +/-10% wisselstroom; ca 19W met netadptor
Omgevingstemperatuur:	0° ~ +40°C
Relatieve luchtvochtigheid:	minder dan 90%
Afmetingen:	kamera: met zoomlens 90(b) x 233(h) x 431mm(d) CCU: zonder bedieningsorganen 116x65x200mm
Gewicht:	kamera: ca. 2,5 kg CCU: ca. 0,8 kg

STANDARD COMPOSITION

● Camera head	1 pc
● CCU	1 pc.
● Zoom lens 6X, f17~102mm, F2.0	1 pc.
● Hand Strap	1 pc.
● Electronic Viewfinder (built-in)	1 pc.
● ND Filter	1 pc.

NORMALER LIEFERUMFAHG

● Kamerakopf	1 Stück
● Kontrolleinheit, CCU	1 Stück
● Zoomobjektiv 6X, f17–102mm, f/2,0	1 Stück
● Handschlaufe	1 Stück
● elektronischer Sucher (eingebaut)	1 Stück
● Graufilter	1 Stück

COMPOSITION STANDARD

● Caméra	1 pc
● Un. Réglage	1 pc
● Zoom 6X, f17 ~ 102 mm, F2,0	1 pc
● Dragonne	1 pc
● Viseur électronique (incorporé)	1 pc
● Filtre ND	1 pc

STANDAARD SAMENSTELLING

● Kamera	1 st.
● CCU	1 st.
● Zoomlens 6X, f17–102mm, F 2,0	1 st.
● Hand snoer	1 st.
● Electronische zoeker (ingebouwd)	1 st.
● ND filter	1 st.

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

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Service Manual

Vol. 1

Circuit Description

PAL COLOUR TV CAMERAS

WV-3300E/3310E

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1. OUTLINE OF WV-3300E AND WV-3310E

Color Camera WV-3300E consists of the following:

Camera head with electrical viewfinder,camera control unit, and zoom lens.

Color Camera WV-3310E consists of the following:

Camera head with optical viewfinder, camera control unit, AC adaptor, and fixed focal lens.

The camera head contains four built-in printed circuit boards – Deflection circuit board (YWV3301EZK01), Shading circuit board (YWV3301ZK02), High Voltage circuit board (YWV3301ZK03), and Vidicon Socket circuit board (YWV3301ZK04).

In the electrical viewfinder, a Viewfinder circuit board (YWV3304EZK05) is incorporated.

The camera control unit (CCU) contains two built-in printed circuit boards, namely, the Process-1 circuit board (YWV3302EZK07), and Process-2 circuit board (YWV3302EZK08).

The AC adaptor contains two built-in circuit boards, which are 12V circuit board (YWV3303EZK01) and Connector circuit board (YWV3303EZK02).

1. Camera Head

The incoming light through the lens goes into the vidicon(Cosvicon)with a built-in stripe filter. Here, in the vidicon, the light is converted into video signals with the red and blue signals modulated at 3.8 MHz. The converted signal from the vidicon is amplified by the preamplifier circuit and then supplied to the CCU as a pre-output signal via camera cable after the optical black component is clamped.

The pre-output signal is now supplied to the lag compensation circuit to generate a lag compensation signal for reducing the lag of vidicon. This signal is supplied into the viewfinder as video signals.

The lag compensation signal is fed into the dark shading correction circuit for application to the vidicon together with the dark shading correction signal and the output of the dynamic focus circuit.

The audio output from the electret condenser microphone is amplified by the audio circuit and then fed into the 10pin VTR/AC adaptor connector of the CCU via a camera cable.

The horizontal scanning start (Hs) pulse supplied from the Process-1 circuit board of the CCU is supplied to the horizontal (H) deflection circuit via sync separation circuit to generate H. deflection sawtooth current. Similarly, the vertical scanning start (Vs) pulse is supplied to the vertical (V) deflection circuit to generate V. deflection sawtooth current.

The H and V deflection sawtooth current is supplied to the H and V deflection coils within the coil assembly for scanning the electron beam of the vidicon.

The H pulse from the H. deflection circuit is fed into the pulse generator circuit, converted into a 1/2 horizontal frequency pulse, and then supplied to the high voltage circuit to generate high voltage with the DC to DC converter for application to each grid of the vidicon.

The Hs pulse from the sync separation circuit is supplied to the dark shading correction circuit and then converted into the H. sawtooth signal and H. parabola signal to generate the dark shading corretion signal. These signals now become correction signals for correcting inequality of vidicon's dark signal levels. This correction signal is supplied to the vidicon together with the aforementioned lag compensation signal. The aforementioned H. sawtooth signal and the H. parabola signal, and V. sawtooth signal and the V. parabola signal supplied from the V. deflection circuit, are supplied to the dynamic focus circuit to generate a dynamic focus signal necessary to equally focus electron beams on the entire scanning area of the vidicon. This signal is also supplied to the vidicon together with the lag compensation signal, dark shading signal, and blanking signal.

The Hs pulse, and the V. sawtooth signal from the V. deflection circuit are mixed to generate a blanking signal.

The target voltage control circuit is intended to automatically control the dark current level of the vidicon (which changes with temperature) by varying the target voltage.

The light indicator circuit applies the voltage rectified within the CCU into the comparator to compare it with the fixed bias voltage and at the same time causes the light indicator to light.

The VTR remote control circuit converts the signal into either a high or low level through operation of the VTR start/stop switch for feeding into CCU, turns the VTR ON/OFF, and at the same time causes the tally lamp of the viewfinder to light.

The +9V regulator circuit regulates +10V power supplied from the CCU. Here, the +9V regulated power is used as a power for the camera head and each circuit of the viewfinder.

The +3V regulator circuit regulates +9V power from the +9V regulator circuit. The +3V regulated power is used as bias voltage for each circuit of the camera head.

The viewfinder (V/F) video signal supplied from the camera head is amplified within the viewfinder circuit board and then supplied to the cathode-ray tube (CRT). Also, the sync signal supplied from the camera head is supplied to the H. and V. deflection circuit via an inverter. The H. and V. deflection sawtooth current generated in this circuit is fed into the respective deflection coil assembly for display on the CRT.

The H. pulse obtained at the H. deflection circuit is supplied to the high voltage circuit and rectified. The rectified DC voltages are supplied to the anode of the CRT and each grid.

The V. sawtooth signal from the V. deflection circuit and the H. pulse from the high voltage circuit are mixed to provide a composite blanking pulse. This pulse is fed into the cathode (K) of the CRT for erasing the blanking line on the CRT screen.

2. Camera Control Unit (CCU)

The pre-out signal modulated at 3.8 MHz and supplied from the camera head via a camera cable is split into the red (R) signal and the blue (B) signal by the red/blue separation circuit. At this time, shading correction and degamma correction is made to correct the inequality of the signal level. The R and B signals are supplied into the red and blue signal processing circuits, respectively, for gain control, demodulation and gamma correction. These signals are fed into the R-Y$_L$ and B-Y$_L$ modulator circuit.

On the other hand, the modulated pre-out signal from the camera head is fed into the luminance signal processing circuit to obtain a luminance signal, Y$_L$, Y$_H$, Y (edge) signals, and DC voltage. The Y$_L$ signal is supplied to the R-Y$_L$ and B-Y$_L$ modulator circuit, Y$_H$ signal to the video signal circuit for PAL, Y (edge) signal to the vertical edge signal circuit, and DC voltage to the light indicator circuit.

The Vs pulse and Hs pulse are supplied to the sawtooth generator circuit and the parabola generator circuit, respectively, to generate a shading correction signal for application to the aforementioned separation circuit.

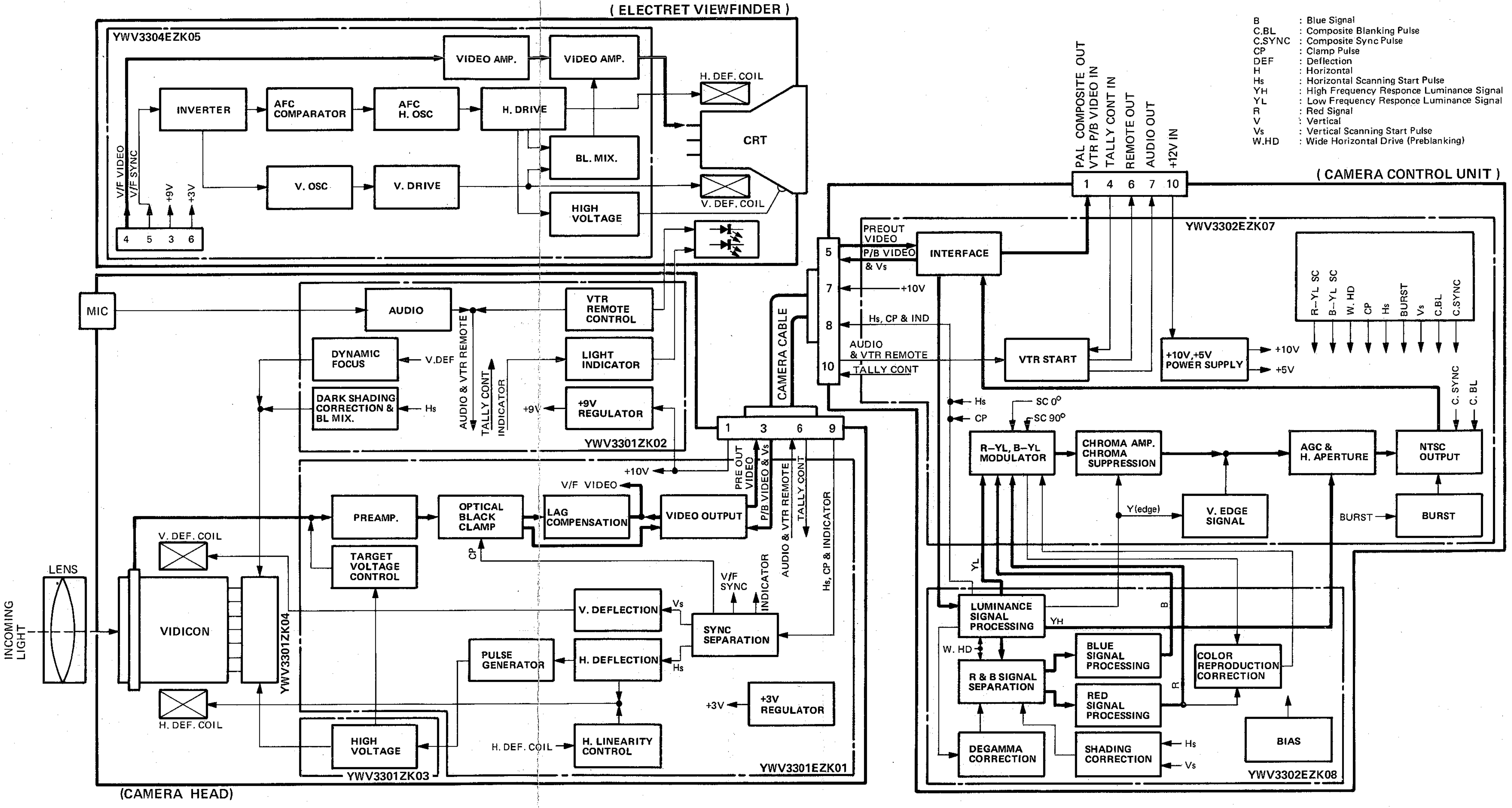
The R signal and Y$_L$ signal are supplied to the modulator to generate a R-Y$_L$ modulated signal. Similarly, the B signal and Y$_L$ signal are modulated to generate a B-Y$_L$ modulated signal.

The R-Y$_L$ and B-Y$_L$ modulated signals are mixed to become a chrominance signal. By mixing the aperture signal, Y$_H$ signal, burst signal, and sync signal with this signal, a PAL composite signal can be generated for application to the output connector of the CCU.

The +10V and +5V power supply regulator circuit is used to generate regulated +10V and +5V voltages from +12V power supplied from the multi-pin connector of the CCU. +10V is supplied to each circuit of the CCU as a power source and +5V is supplied to the sync generator circuit.

The sync generator circuit generates such signals as R-Y$_L$ SC, B-Y$_L$ SC, wide horizontal drive (pre-blanking) pulse, clamp pulse (CP), horizontal scanning start (Hs) pulse, burst signal, vertical scanning start (Vs) pulse, composite blanking signal (C. BL), and sync signal for application to the circuits in the camera head and CCU.

OUTLINE BLOCK DIAGRAM


(ELECTRET VIEWFINDER)
YWV3304EZK05
VIDEO AMP.
VIDEO AMP.
H. DEF. COIL
INVERTER
AFC COMPARATOR
AFC H. OSC
H. DRIVE
CRT
BL. MIX.
V. OSC
V. DRIVE
HIGH VOLTAGE
V. DEF. COIL
V/F VIDEO
V/F SYNC
+9V
+3V
4 5 3 6
MIC
AUDIO
VTR REMOTE CONTROL
DYNAMIC FOCUS
V.DEF
LIGHT INDICATOR
DARK SHADING CORRECTION & BL MIX.
Hs
AUDIO & VTR REMOTE
TALLY CONT
INDICATOR
+9V
+9V REGULATOR
YWV3301ZK02
CAMERA CABLE
1 3 6 9
5 7 8 10
+10V
V/F VIDEO
PREAMP.
OPTICAL BLACK CLAMP
LAG COMPENSATION
VIDEO OUTPUT
PRE OUT VIDEO
P/B VIDEO & Vs
AUDIO & VTR REMOTE
TALLY CONT
Hs, CP & INDICATOR
INDICATOR
V. DEF. COIL
LENS
INCOMING LIGHT
VIDICON
YWV3301ZK04
TARGET VOLTAGE CONTROL
CP
V/F SYNC
V. DEFLECTION
Vs
SYNC SEPARATION
PULSE GENERATOR
H. DEFLECTION
Hs
H. DEF. COIL
+3V
+3V REGULATOR
HIGH VOLTAGE
H. DEF. COIL
H. LINEARITY CONTROL
YWV3301ZK03
YWV3301EZK01
(CAMERA HEAD)
PAL COMPOSITE OUT
VTR P/B VIDEO IN
TALLY CONT IN
REMOTE OUT
AUDIO OUT
+12V IN
1 4 6 7 10
(CAMERA CONTROL UNIT)
YWV3302EZK07
PREOUT VIDEO
P/B VIDEO & Vs
INTERFACE
+10V
Hs, CP & IND
AUDIO & VTR REMOTE
TALLY CONT
VTR START
+10V,+5V POWER SUPPLY
+10V
+5V
R-YL SC
B-YL SC
W. HD
CP
Hs
BURST
Vs
C.BL
C.SYNC
Hs
CP
SC 0°
SC 90°
R-YL, B-YL MODULATOR
CHROMA AMP. CHROMA SUPPRESSION
AGC & H. APERTURE
NTSC OUTPUT
C. SYNC
C. BL
Y(edge)
V. EDGE SIGNAL
BURST
BURST
YL
B
LUMINANCE SIGNAL PROCESSING
YH
W. HD
R & B SIGNAL SEPARATION
BLUE SIGNAL PROCESSING
RED SIGNAL PROCESSING
R
COLOR REPRODUCTION CORRECTION
DEGAMMA CORRECTION
SHADING CORRECTION
Hs
Vs
BIAS
YWV3302EZK08

B	:	Blue Signal
C.BL	:	Composite Blanking Pulse
C.SYNC	:	Composite Sync Pulse
CP	:	Clamp Pulse
DEF	:	Deflection
H	:	Horizontal
Hs	:	Horizontal Scanning Start Pulse
YH	:	High Frequency Responce Luminance Signal
YL	:	Low Frequency Responce Luminance Signal
R	:	Red Signal
V	:	Vertical
Vs	:	Vertical Scanning Start Pulse
W.HD	:	Wide Horizontal Drive (Preblanking)

2. CIRCUIT DESCRIPTION OF CAMERA HEAD

1. Principle of Single Carrier Frequency Multiplexing System using a Single Tube

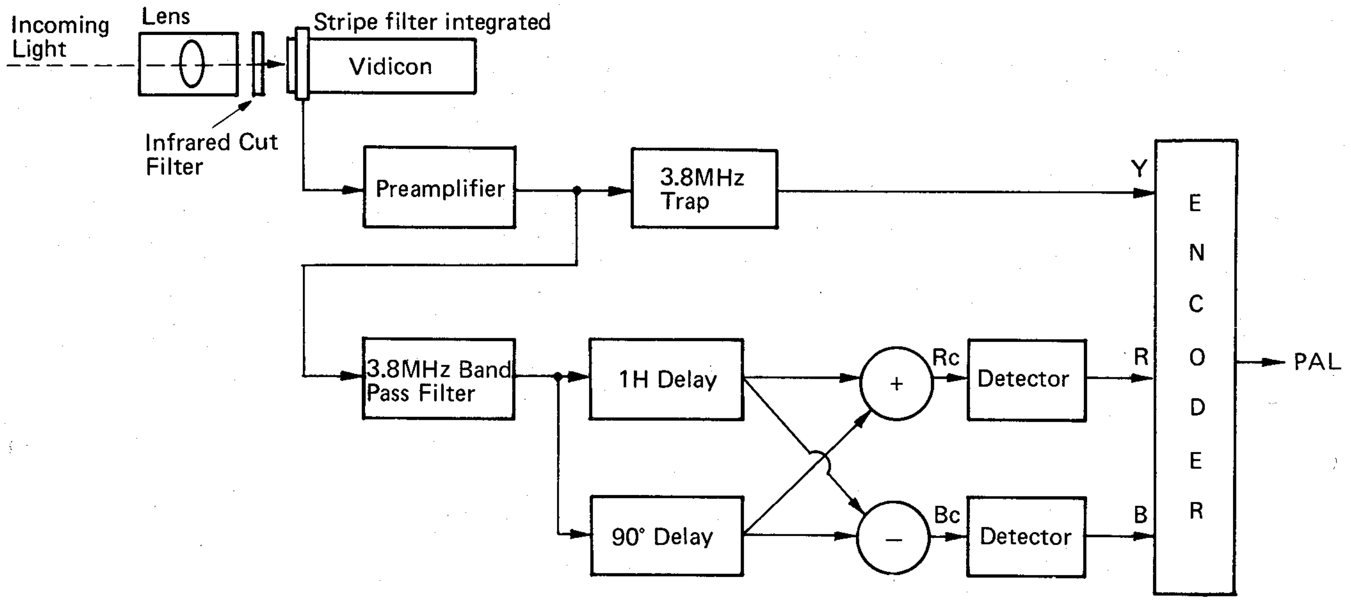

Incoming Light
Lens
Stripe filter integrated
Vidicon
Infrared Cut Filter
Preamplifier
3.8MHz Trap
Y
ENCODER
PAL
3.8MHz Band Pass Filter
1H Delay
90° Delay
Rc
Bc
+
−
Detector
Detector
R
B

Fig. 2-1 Principle of Single Carrier Frequency Multiplexing System using a Single Tube

The incoming light to the camera passes through the lens and the infrared (IR) cut filter installed in the camera lens mount in front of the 1-inch vidicon (Cosvicon S4089) with a built-in stripe filter. As shown in Fig. 2-2, the IR cut filter cuts off the infrared light rays which the human eye does not see as light.

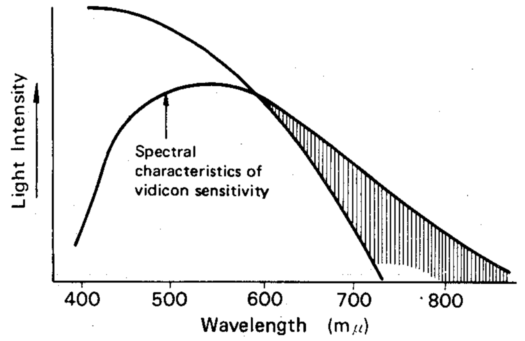


Fig. 2-2 IR Cut Filter

As shown in Fig. 2-3 Ⓑ, the integrally built-in stripe filter in the vidicon, consists of a cyan/transparent stripe filter section and a yellow/transparent stripe filter section. These stripe filters are so arranged as to be of the same pitch in the horizontal scanning direction, and equal angle in the vertical directions. The vidicon's even and odd scanning lines pass the tracks of the stripe filters that are arranged in the same way. In other words, the even and odd scanning lines are spaced "a" apart.

For easy understanding, let's assume that light of uniform level containing green (G), red (R) and blue (B) reaches the vidicon (Fig. 2-3 Ⓐ), and the cross-point of the cyan and yellow stripe filter is scanned as shown in Fig. 2-3 Ⓑ.

The cyan filter cuts off the R. light which is complementary to it (Fig. 2-3 Ⓒ), and the yellow filter cuts off the B. light which is complementary to it (Fig. 2-3 Ⓓ). At the Nth scanning line the signal Ⓔ which contains the modulated R. and B. signals, and G. signal is obtained. At the N + 1st scanning line, the signal Ⓕ which contains the modulated R. and B. signals and G. signal is obtained. The stripe filters have the same pitch in the horizontal scanning direction, and the same angle in the vertical directions so that there is a phase difference of 90° between the Nth and the N + 1st modulated signals. The modulation frequency for the R. and B. signals can be calculated from the following equation.

$$f = \frac{w \times 10^3}{p \times t} \quad [\text{MHz}]$$

Here, f: Modulation frequency [MHz];
w: Horizontal width of effective scanning area of vidicon [mm];
p: Stripe filter pitch [μm];
t: Horizontal video signal duration [= line duration (1H) − horizontal blanking duration (H.BL)] [μm];

Specifically, w = 11 mm;
t = 1H − H. BL = 64 − 11.85 = 52.15 μs;
p = 55.6 μm;

$$f = \frac{w \times 10^3}{p \times t} = \frac{11 \times 10^3}{55.6 \times 52.15} \approx 3.8 \text{ MHz.}$$

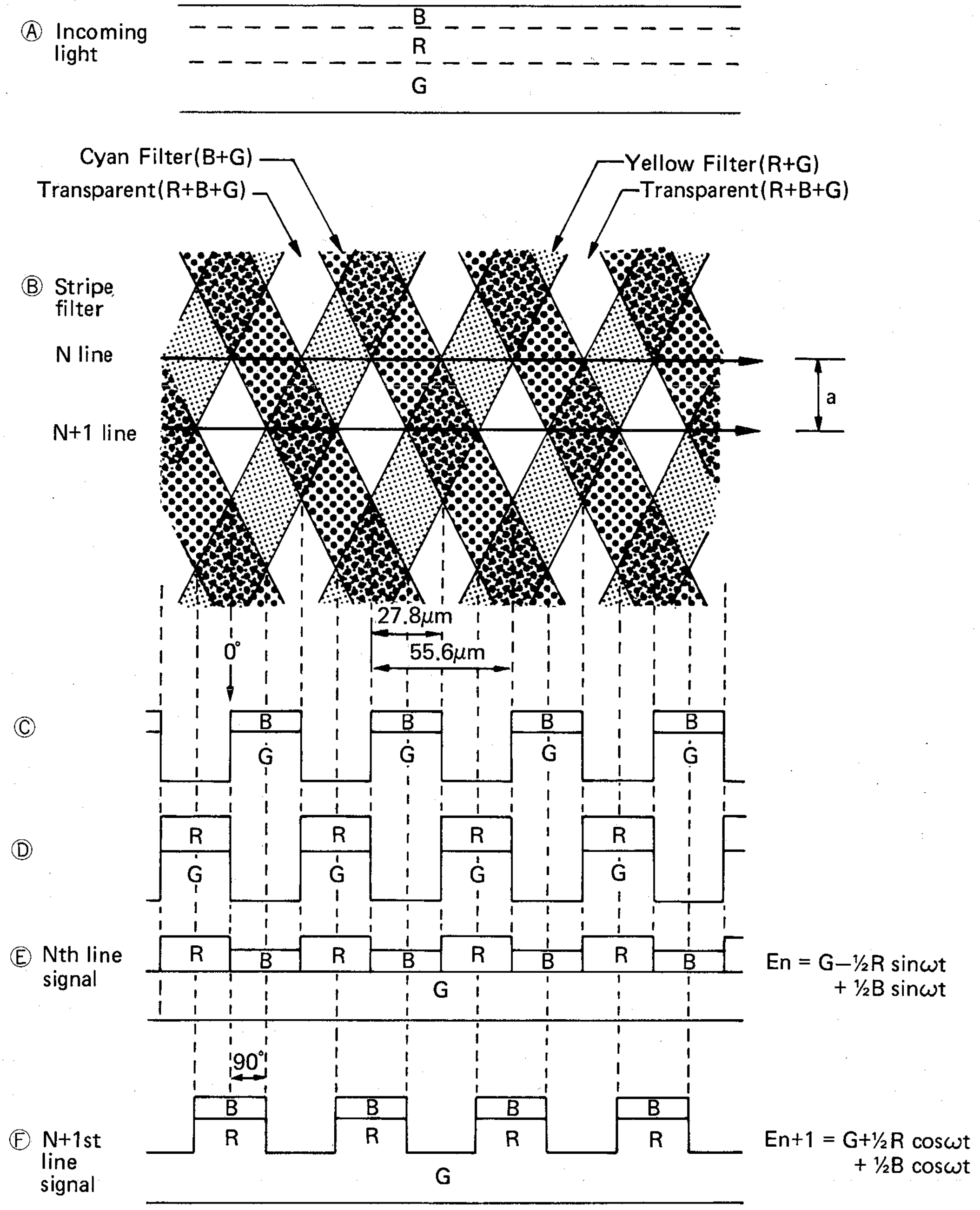

Ⓐ Incoming light
B
R
G
Cyan Filter(B+G)
Transparent(R+B+G)
Yellow Filter(R+G)
Transparent(R+B+G)
Ⓑ Stripe filter
N line
N+1 line
a
27.8μm
55.6μm
0°
Ⓒ
B
G
Ⓓ
R
G
Ⓔ Nth line signal
R
B
G
En = G−½R sinωt + ½B sinωt
90°
Ⓕ N+1st line signal
B
R
G
En+1 = G+½R cosωt + ½B cosωt

Fig. 2-3 Signal from Vidicon

The incoming light is thus converted by the integrated stripe filter into a signal which contains R. and B. signals modulated by 3.8MHz, and G signal. This signal is sent to the preamplifier, where it is amplified. The amplified signal Ⓖ from the preamplifier is sent to the 3.8 MHz trap circuit, which passes only the luminance (Y) signal Ⓗ comprising the G. signal and the mean value of the modulated R. and B. signals.

The amplified signal Ⓖ is also supplied to the band-pass filter (BPF) whose center frequency is 3.8 MHz, through which only the 3.8 MHz modulated signal Ⓘ passes. The modulated signal Ⓘ is sent to the 90° phase shift circuit and the 1H (1 line) delay circuit, from which 90° phase shifted — and 1H-delayed, modulated signals Ⓙ and Ⓚ are obtained. The modulated R. (Rc) signal Ⓛ is obtained by adding the modulated signals Ⓙ and Ⓚ, and a modulated B. (Bc) signal Ⓝ is obtained by subtraction of the modulated signals Ⓙ and Ⓚ. The Rc and Bc signals obtained by addition and subtraction are supplied to detectors, from which R. signal Ⓜ and B signal Ⓞ are obtained. The Y signal is sent to the chrominance mix circuit, R and B. signals are separated from the signal Ⓖ (from the preamplifier) are sent to the chrominance mix circuit through the chroma modulator circuit, which produces a PAL signal.

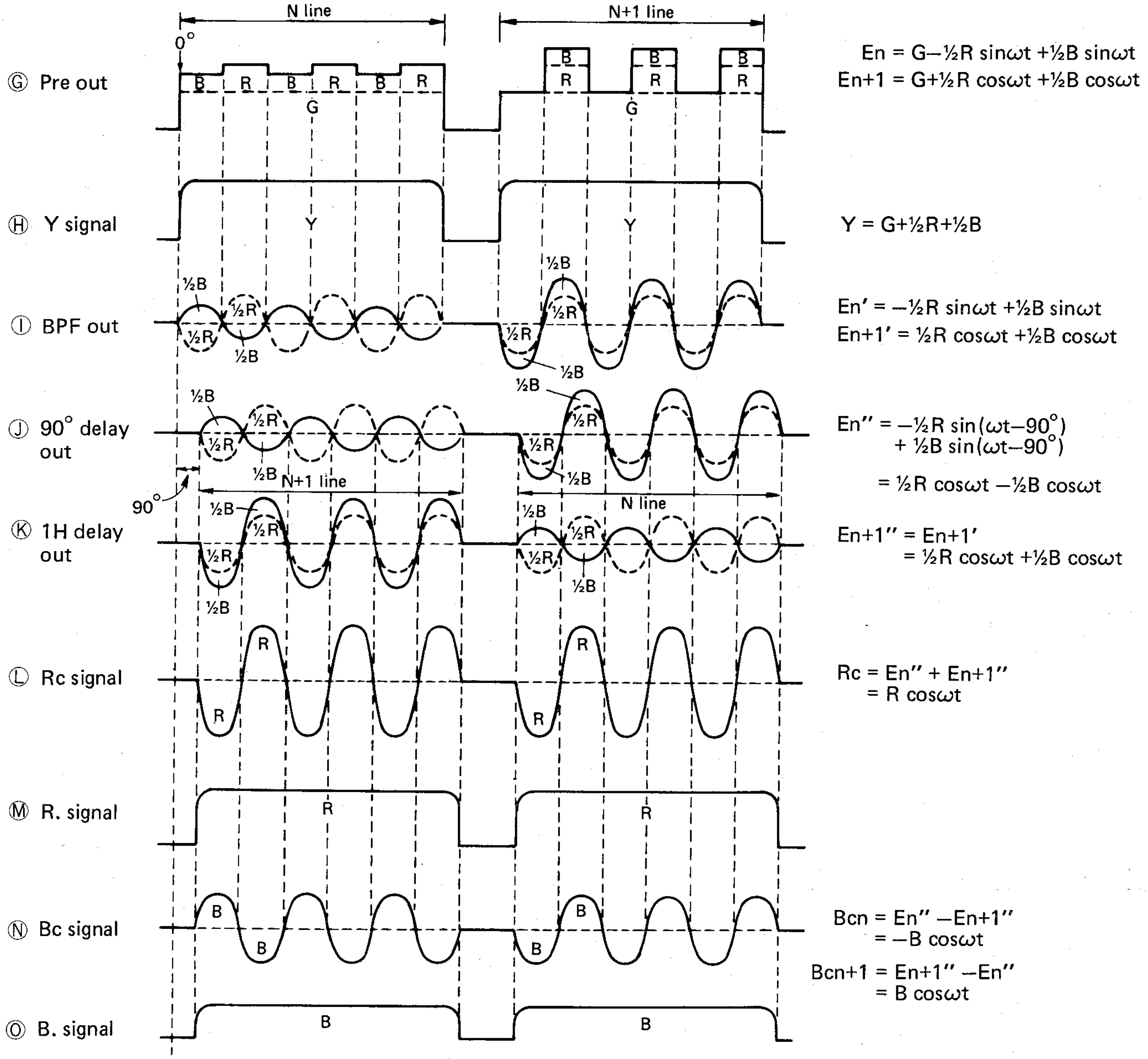

N line
N+1 line
0°
Ⓖ Pre out
B R B R B R
G
Ⓗ Y signal
Y
Ⓘ BPF out
½B
½R
Ⓙ 90° delay out
90°
N+1 line
N line
Ⓚ 1H delay out
Ⓛ Rc signal
R
Ⓜ R. signal
Ⓝ Bc signal
B
Ⓞ B. signal
En = G−½R sinωt +½B sinωt
En+1 = G+½R cosωt +½B cosωt
Y = G+½R+½B
En' = −½R sinωt +½B sinωt
En+1' = ½R cosωt +½B cosωt
En" = −½R sin(ωt−90°) + ½B sin(ωt−90°)
= ½R cosωt −½B cosωt
En+1" = En+1'
= ½R cosωt +½B cosωt
Rc = En" + En+1"
= R cosωt
Bcn = En" −En+1"
= −B cosωt
Bcn+1 = En+1" −En"
= B cosωt

Fig. 2-4 Detection of Y, R and B. signals

2. Vidicon

Different from that of the black-and-white camera, the WV-3300E vidicon has a built-in stripe filter, and a metallic strip called optical black (OB) on the faceplate. The PAL signal black level is set in reference to the signal from the optical black.

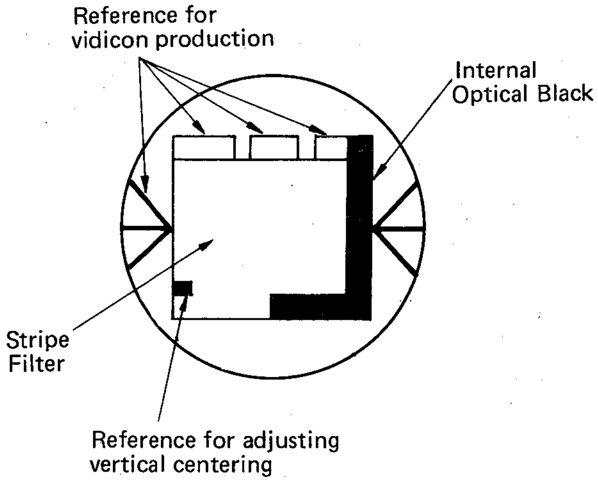

Reference for vidicon production
Internal Optical Black
Stripe Filter
Reference for adjusting vertical centering

Fig. 2-5 Front View of Vidicon

3. Deflection Circuit Board (YWV3301EZK01)

The deflection circuit board (YWV3301EZK01) has the following circuits.

1) Preamplifier circuit
2) Lag compensation circuit
3) Target voltage control circuit
4) Pulse generator circuit (for DC to DC conversion)
5) Video output circuit
6) Sync separation circuit
7) Horizontal deflection circuit
8) Horizontal linearity control circuit
9) Vertical deflection circuit
10) 3V regulator circuit

1. Preamplifier circuit

The signal comprising the G. signal and modulated R and B. signals are supplied from the vidicon target to Q117 (FET) on the preamplifier circuit. The signal which is amplified by Q117 is again amplified by amplifiers Q118, Q119 and Q120. The circuit which is connected between the collector of Q120, and FET gate (C133, C132, and R147) is a negative feedback for Q117. VC101 (FREQUENCY RESPONSE ADJ) is a control for selectively changing the negative feedback according to frequency and thus adjusts the frequency response of the amplified signal. L103 is a coil for the percival circuit which reduces noise near 3.8 MHz.

The signal is amplified by a factor of 85 dB (current gain) using Q117 through Q120 and its frequency response deviation is less than ±1 dB up to 4.5MHz. It is supplied through buffer Q121 to lag compensation circuit as a pre-out signal.

The target voltage is supplied from the target control circuit via R146, and encapsulated resistor network BR102 (a fixed resistor is located between terminals 1 and 2) and L103.

2. lag Compensation Circuit

A residual image lingering after cut off of incoming light to the vidicon is called lag. When a moving object is shot, or when the camera is panned, it exhibits a trailing image. This is the same phenomenon. Generally, more incoming light to the vidicon causes less lag; and less incoming light to the vidicon causes more lag. In this color camera, which makes mudulated red (R) and blue (B) signals (high frequency component) by lapping them over the green (G) signal (low frequency component), the modulated R and B. signals will have less lag; while the G. signal will have more lag. Therefore, lag is colored green.

The lag compensation circuit reduces the low frequency component lag to match it with the high frequency component lag by positive feedback of more low frequency component to the vidicon cathode, thereby reducing unnatural Green/magenata lag signal. The difference in the amount of feedback between the low frequency component and the high frequency component is determined by the gamma correction of the output signal from the preamplifier.

The pre-output signal from the preamplifier circuit runs via VR106 (VIDEO GAIN), amplifier Q122, and buffer Q123/Q124 to the optical black clamp circuit Q125.

● Optical black clamp circuit

The pick-up tube sends an output current corresponding to the incoming light intensity, but even when no light reaches the target, an output current called dark current is obtained. The dark current of the vidicon is relatively large and varies with the temperature of the vidicon. In a TV camera using a vidicon the black level of the output signal is extremely unstable with respect to changing temperature. In a color camera using the single carrier frequency multiplex system, the red (R) and blue (B) signals modulated at 3.8 MHz and riding on top of the green (G) signal, and taken out. Thus the black level of the R and B. signals are free of temperature variations. Because they are independent of vidicon dark current. However, the black level of the Y signal taken out by removing R and B components, modulated at 3.8 MHz, from the vidicon output signal does suffer adversely with respect to the dark current which increases or decreases according to temperature variations. Therefore, the black level balance between the Y_L and R signals, and between Y_L and B signals, is imperfect due to a temperature difference, and this causes a change in color reproduction.

A metallic strip (internal optical black) for cutting off the incoming light at the end of the horizontal scanning is built into the vidicon. When the beam scans the optical black portion, the dark current of the vidicon is sampled and this signal portion is clamped to a fixed DC potential, so that the black level variations due to a change in dark current are tracked. In other words, the dark current of the pre-output signal supplied to the FET Q125 clamp drain (D) is clamped to the source (S) potential of Q125 by the clamp pulse (CP) supplied to the gate (G). Therefore, even if the dark current level drifts due to a change in the temperature, the DC potential of the optical black (OB) level is held constant. The clamp potential of the OB level is determined by R157, R158, R159 and +9V line.

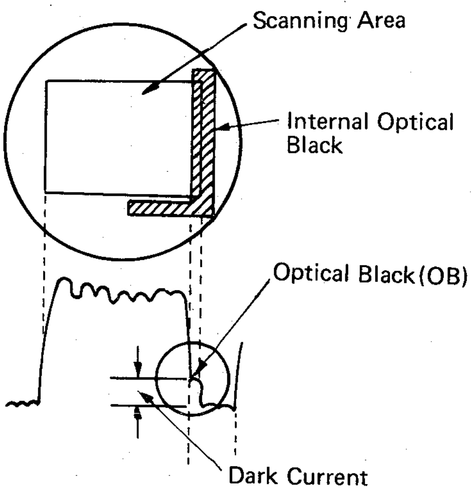


Fig. 2-6 Dark Current Detection

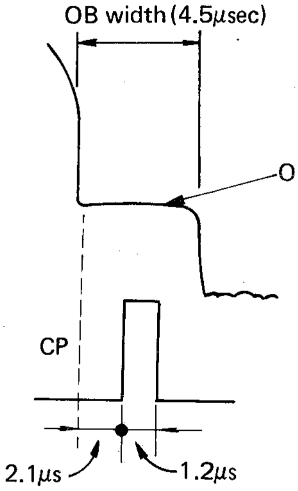


Fig. 2-7 Optical Black Clamp

Both the positive going CP and negative going horizontal scanning start (Hs) pulses appear on the gate (G) of Q125, which is turned ON only by the positive CP pulse. The clamped signal runs via the buffer Q126 and buffer Q127 to the 3.8 MHz carrier trap circuit, which consists of L105 and C142, where the 3.8 MHz carrier signal is removed. The output signal from this circuit is fed to the gamma correction circuit Q128, which suppresses high levels, that is, the high frequency components. After gamma correction, the signal is sent to buffer Q130. The negative signal obtained from the collector of Q130 is passed via VR107 (LAG ADJ) to the dark shading correction circuit on the shading circuit board (YWV3301ZK02) as a lag compensating signal, which it is sent together with the dark shading correction signals to the vidicon cathode (K).

VR107 is a control for setting optimum lag compensation. The positive signal obtained from Q130 emitter is sent to viewfinder via amplifier Q131 and terminal 4 of the multi-pin connector CN202. C144 is a capacitor for correcting the frequency response of the viewfinder video signal.

When the video tape recorder operated in conjuntion with this camera is in the playback mode, the playback signal from the VTR is routed via camera control unit (CCU), terminal 3 of the multi-pin connector CN101, Q103, Q104 and Q105 to the base of Q131.

When the VTR is in the playback mode, presence of the playback signal is detected in the CCU. Under this condition the power for the CCU is cut off so that no sync pulses are generated in the CCU. (The power for the camera head is not cut off, so that a DC voltage of approximately + 10 V is supplied to the camera head.) Since in this case no sync pulses are supplied to the horizontal and vertical deflection as well as high voltage circuits in the camera head, no video signals can be obtained from the vidicon. Thus, only the playback signal from the VTR appears on the base of Q131, and are fed to the viewfinder via Q131. It is in this way that the video tape recorder's playback picture can be seen on the viewfinder screen.

Q101, which is connected to the gate (G) of Q125 through a resistor block BR101 compensates for the changed clamp potential of Q125 when the VTR is in the playback mode, and makes the base voltage of Q131 the same level as when the VTR is recording the camera signal.

When the VTR is in the record mode, Q101 is turned ON by the indicator control DC voltage corresponding to peak video signal level, which carries with it the CP and Hs pulses. Thus, Q125 is energized by the positive going CP pulses, and the base of Q126 is clamped to the source potential of Q125.

When the VTR is set into the playback mode, neither CP and Hs pulses nor the indicator control DC voltage are supplied. Therefore, no CP pulse is sent to Q125. However, since Q101 is turned OFF, the gate(G) voltage of Q125 is raised to a higher potential to keep Q125 energized, and the base of Q126 is clamped at the source potential of Q125.

The clamped signal obtained from the emitter of Q126 is fed to the video output circuit Q103.

3. Target voltage control circuit

The pickup tube sends an output signal which corresponds to the incoming light intensity, and even when no light reaches the tube, an output signal called dark current is produced. The vidicon's dark current is relatively large and varies according to the vidicon temperature so that the black level of the output signal tends to drift. The target voltage control circuit tracks the vidicon's temperature variations, and controls the target voltage according to the temperature drift, and thus reduces dark current variations. This circuit, and the aforementioned optical black clamp circuit, stabilize the black level excursions from normal.

The deflection coil assembly has a built-in temperature detecting thermistor which is connected between terminals Ⓢ and Ⓢ· of the multi-pin connector CN102. When the temperature inside the coil assembly changes (it also changes in the vidicon), the thermistor resistance changes, causing the emitter voltage of the DC amplifier Q132 to change which in turn changes the collector voltage. The target voltage applied to the vidicon is set by VR108(TARGET ADJ). If the temperature goes up, the resistance of the thermistor decreases so that the emitter voltage of Q132 falls. Accordingly, the collector potential of Q132 also falls, and the target voltage set by VR108 is reduced. Reduced target voltage causes less output from the tube. In this way the video dark current which is raised by an increase in temperature is lowered. When the temperature falls, the reverse operation takes place.

4. Pulse generator circuit (for DC to DC converter)

This circuit generates pulses which drive the DC-DC converter on the high voltage circuit board (YWV3301ZK03), at rate of half the horizontal frequency (15.734 kHz) and a 50/50 duty cycle. The pulse generator also functions as a vidicon protection circuit.

The horizontal scanning start (Hs) pulse from the collector of Q108 in the horizontal deflection circuit is sent to Pin 1 of flip-flop IC104. The output pulse at pin 2 is frequency devided.

This pulse is clamped to +9 V and ground potentials by D111 and D112 respectively, and supplied to the high voltage circuit board.

- **Sweep protection circuit**

If no current flows in the deflection coils due to a circuit failure in horizontal (H) or vertical (V) deflection, the beam hits the target in one spot only. As a result, the photoconductive layer of the vidicon would burn out, making the vidicon unusable.

The sweep protection circuit protects the photoconductive layer from burn-out in the event of a deflection circuit failure by stopping the generation of high voltages supplied to the vidicon terminals in which case the electron beam is shut off.

The vertical deflection sawtooth signal from Pin 7 of IC103 is rectified by D106 and D107. The rectified DC voltage is applied to the base of Q116. The horizontal deflection signal obtained from the collector of Q109 is rectified by D113. Under normal conditions the rectified DC voltage is about 6 V. The 7 V Zener diode D114 block it from going to the base of Q133. Therefore, the base of Q133 has a low potential. In this case Q133 is cut off, and Q116 is turned ON by the rectified DC from D106/107. Thus ground terminal 4 of IC104 is grounded, and IC104 operates as a flip-flop. If the vertical deflection circuit fails, the DC voltage is not applied to the base of Q116, and Q116 is cut off. Also, if Q108 in the horizontal deflection circuit fails, the Hs pulse is not sent to IC104. If Q109 fails, or if the multi-pin connector CN102 to which the coil assembly is connected is disconnected, the potential at the cathode of D113 increases above 7V, so that a positive DC voltage turns ON Q133 causing Q116 to be cut off shuting OFF the beam and high voltage generation.

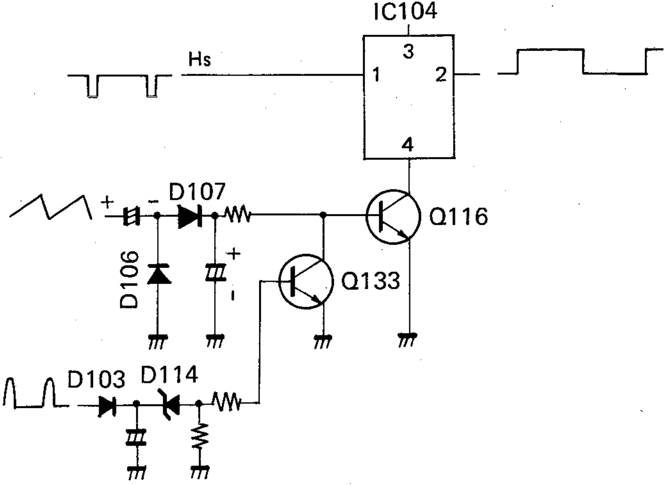


Fig. 2-8 Vidicon Protection Circuit

5. Video output circuit

The video signal whose dark current level is clamped by Clamp pulse (CP) is sent from Q126 emitter via C141 to buffer Q103 and through R105 to terminal 3 of the multi-pin connector CN101, and through the camera cable to the Process-1 circuit board in the CCU.

On the same line a vertical scanning start (Vs) pulse is sent from the Process-1 circuit board, (multiplexed with the video), into the camera head. The Vs pulse is sent to the "sync separator" which is described next.

6. Sync separation circuit

One of these circuits separate the Vs pulse sent from the Process-1 circuit board (YWV3302EKZ07) in the CCU but mixed with video signal; going to the CCU, and another circuit which separates the Hs pulse from the mixed signal consisting of the clamp pulse (CP), horizontal scanning start (Hs) pulse and light indicator control DC voltage (corresponding to the video signal level), all sent from the Process-1 circuit board of the CCU. The mixed video and Vs pulse appear on terminal 3 of the multi-pin connector CN101 and the emitter of Q103. The Vs pulse is routed via the common base amplifier Q103 to amplifier Q104. Q103 operates as a phase splitter for the video signal applied to its base; and the positive and negative video obtained at the emitter and collector of Q103 are cancelled through R106 and R107 so that no video is supplied to Q104. Therefore, only the Vs pulse is applied to Q104 emitter.

The Vs pulse obtained from the collector of Q104 is sent via buffer Q105 to the viewfinder via Q131 as well as the switching amplifier Q106/Q107. Q106/Q107 amplifies the pulse, which is supplied from the collector of Q107 to the vertical deflection circuit and the viewfinder as a vertical sync pulse component.

The multiplexed signals (CP, Hs pulse, and the light indicator control DC voltage) are supplied from Process-1 circuit board (in the CCU) to inverter Q102 via Pin 9 of CN101. The DC voltage is blocked by C103, and CP and Hs pulse are applied to the base of Q102. The Hs pulse which is of negative polarity turns ON Q102; and a polarity-inverted Hs pulse is obtained at its collector. The Hs pulse thus separated is sent to the horizontal deflection circuit.

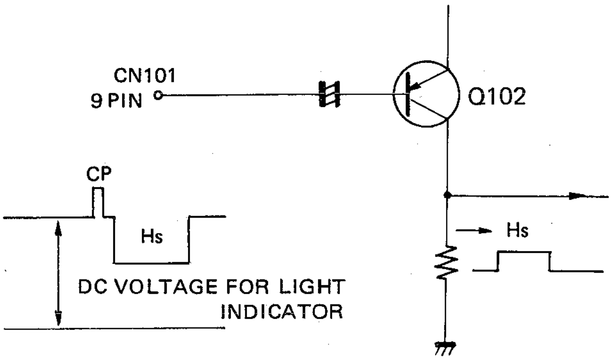


Fig. 2-9 Sync Separation

7. Horizontal deflection circuit

This circuit generates the sawtooth current for the horizontal (H) deflection of the vidicon and supplies that sawtooth current to the horizontal deflection coil. The horizontal scanning start (Hs) pulse supplied from the separation circuit (Q102) goes via the inverter Q108 to the horizontal deflection output Q109.

The Hs pulse obtained from the collector of Q108 is also sent through D102 and it is mixed with the Vs pulse from Q107, and the mixed signal is sent to the viewfinder as a composite sync pulse. When Q109 is switched by the Hs pulse from Q108, the collector current pulse of Q109 resonates with L101 and C114, and the resultant horizontal flyback pulse supplies the horizontal deflection coil.

VR101 (H. WIDTH) is the control for regulating the amplitude of horizontal deflection waveform to set horizontal scanning size.

The horizontal deflection pulse from Q109 is rectified by D113 and C124, and the rectified voltage is applied to Zener diode D114. In normal operation, the voltage at this point will be about 6 V and the Zener diode will break down and conduct at 7 V. Therefore, no signal is passed.

Should the horizontal sweep transistor fail (open) or the deflection coil become open or disconnected, the voltage rise above 7 V, the diode D114 will conduct and applied to the base of Q133 in the sweep protection circuit. This will cut off high voltage generation and protect the vidicon.

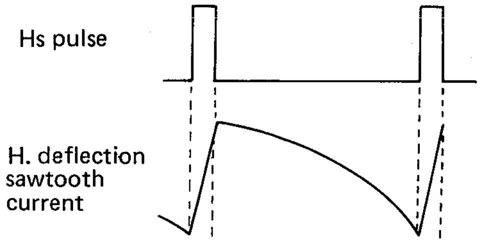
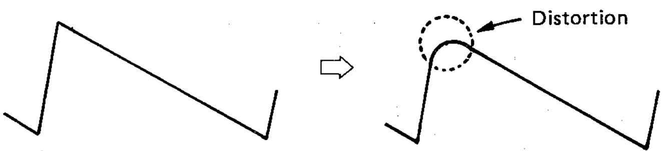


Fig. 2-10 Horizontal Deflection

8. Horizontal linearity correction circuit

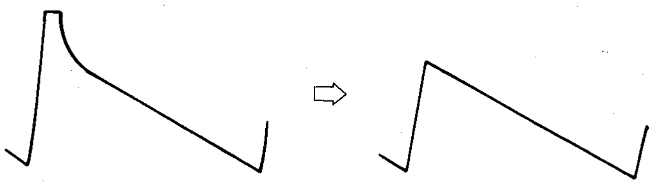
The horizontal (H) deflection drive circuit is a switching type circuit, so that the generated sawtooth current waveform has poor linearity.

By feeding the sawtooth current to the deflection coil, the intensity of the magnetic field generated in the deflection coil changes, and the vidicon's electron beam scans. If a linear sawtooth current Ⓐ is sent to the deflection coil, however, the magnetic field in the scanning start portion is distorted Ⓑ due to the effect of the vidicon electrodes, coil hysteresis, etc. As a result, the linearity of the scanning start portion deteriorates, and a shading (unevenness of amplitude) appears in the edge of the video signal. Therefore, in order to generate a linear magnetic field intensity Ⓒ and to correct the linearity and shading of the beginning scanning portion, it is necessary to feed a nonlinear sawtooth signal Ⓓ to the deflection coil.



Ⓐ Sawtooth current

Ⓑ Magnetic field



Ⓒ Corrected sawtooth current

Ⓓ Corrected Magnetic field

Fig. 2-11 Linearity Control

This circuit generates a waveform to "correct" the linearity of horizontal sawtooth current waveform and its starting portion. As shown in Fig.2-12, the horizontal deflection circuit is connected to one end of the horizontal deflection coil, and the horizontal linearity control circuit to the other end.

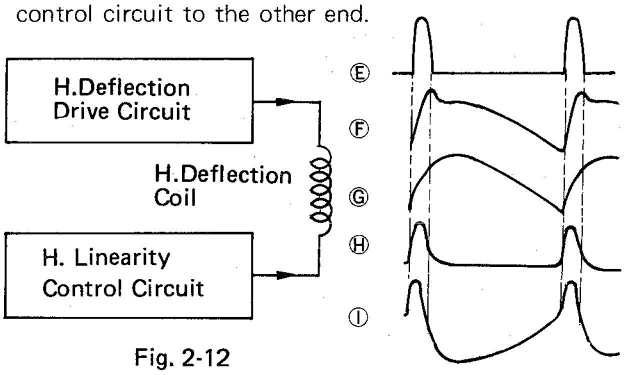


Fig. 2-12

The horizontal deflection pulse Ⓔ produced from the collector of Q109 in the horizontal (H) deflection circuit is integrated by L102 and R129 into a sawtooth signal Ⓕ. This sawtooth signal is again integrated by R128 and C117 into a parabola signal Ⓖ, which is applied to Pin 2 of the differential amplifier IC101 as a horizontal linearity correction signal. The horizontal deflection pulse Ⓔ from Q109 is integrated by R122 and C115 into a linearity correction signal Ⓗ for correcting the linearity of the starting portion of the horizontal sawtooth current waveform. The linearity correction signal Ⓗ is applied to Pin 3 of IC101, where the linearity correction signal and the starting portion linearity correction signal are amplified. The mixed signal Ⓘ of these linearity correction signals is fed via the buffer output Q110/Q111 to the horizontal deflection coil to correct the linearity of the horizontal sawtooth current waveform.

VR102 (H. LIN) is a control for adjusting the linearity of the starting portion. VR103 (H. CENT) is a centering control which controls the positive input potential of IC101 to change the direct current flowing to the deflection coil, and thus sets the horizontal scanning position on the vidicon.

9. Vertical deflection circuit

This circuit generates a sawtooth current for the vertical (V) deflection of the vidicon, and feeds the sawtooth current to the vertical deflection coil. The vertical scanning start (Vs) pulse sent from the sync separation circuit Q106/Q107 is fed to the sawtooth generator Q112, which converts it into a vertical rate sawtooth. This sawtooth signal is applied to Pin 2 of the amplifier IC102, which produces an amplified vertical sawtooth signal from its Pin 6. This amplified signal is sent via the vertical deflection output Q113/Q114 to the vertical deflection coil. The sawtooth current flowing to the vertical deflection coil is detected by R135, which is connected in series with the deflection coil, and fed back to the sawtooth generator Q112, thus correcting the linearity of the vertical sawtooth waveform. Therefore, a linear sawtooth current flows in the vertical deflection coil. The vertical sawtooth waveform obtained from Q113/Q114 is supplied to Q209 on the shading correction circuit board (YWV3301ZK02) as a vertical blanking signal for the vidicon.

The vertical sawtooth signal detected by R135 is applied to Pin 5 of the amplifier IC103 (1/2), where it is amplified. The vertical sawtooth signal from Pin 7 of IC103 and the vertical parabola signal generated by integrating it by means of R143 and C123 are supplied to the dynamic focus circuit on the shading correction circuit board. The DC voltage obtained by rectifying the vertical sawtooth signal by D106 and D107 is applied to the base of Q116 in the sweep protection circuit to hold Q116 ON as long as the vertical deflection sawtooth signal is present. If vertical deflection (sweep) should fail, Q116 will turn off and high voltage generation will stop to protect the vidicon.

VR104 (V. SIZE) is the control for changing the amplitude of the vertical deflection sawtooth waveform to set vertical scanning size. VR105 (V. CENT) is a centering control which controls the direct current flowing to the vertical deflection coil to set the vertical scanning position on the vidicon.

10. 3V regulator circuit

The 3-V power is generated by regulating the 9V power supply with IC103 (1/2).

The output voltage of IC103 is applied to the base of Q115, and the emitter output of Q115 is applied to Pin 2 of IC103 to form a loop, and thus stabilizing the voltage.

The reference voltage is obtained by dividing the 9V with R139 and R140.

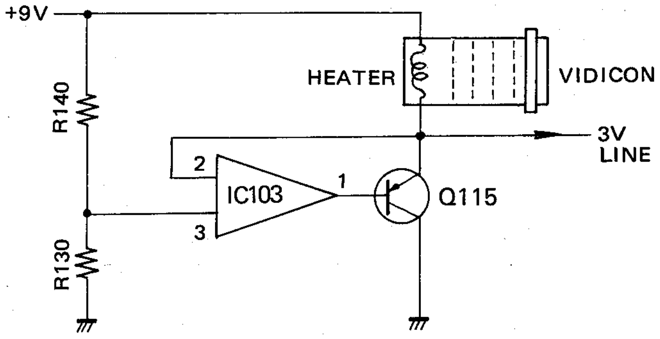


Fig. 2-13

4. Shading Circuit Board (YWV3301ZK02)

The shading circuit board (YWV3301ZK02) consists of the following circuits.

1) Audio preamp circuit
2) VTR remote control circuit
3) Light indicator circuit
4) Dynamic focus correction circuit

5) Dark shading correction circuit and vidicon blanking mix
6) 9V regulator circuit

1. Audio preamp circuit

The −60 dB (1 mV) output from the electret condenser microphone (ECM) which is mounted on the front of the camera head is amplified 40 dB by Q201 and Q202. The audio output is sent via terminal 6 of the multi-pin connector CN101 and the camera cable to the Process-1 circuit board in the camera control unit (CCU), from which it is fed to terminal 7 of the 10-pin VTR connector.

The low-frequency response characteristic of the audio output is controlled by C202, and its high-frequency response characteristic by C203 and R203.

2. VTR remote control circuit

This circuit is a flip-flop circuit which generates video tape recorder start and stop (pause) control signals. The control signals are multiplexed with audio signals before being fed to the Process-1 circuit board (YWV3302EZK07), where the signals are inverted by Q725. The inverted signals are sent via terminal 6 of the 10-pin VTR connector to the video tape recorder.

When the video tape recorder is set in the recording mode, the video tape recorder is started by a high potential from the CCU. If a low potential is sent to it, the video tape recorder stops (pause).

When the power is switched on, Q204 of the flip-flop circuit formed by Q203 and Q204 is energized by the action of C209. The "T" input of the flip-flop is the junction of C207, C208, and the push button switch SW001 causes the F.F. to change state.

In the play mode, a high of about 10 V appears on the audio/remote control line,and D206 prevents the F.F. from changing to the pause mode (Q204 ON). In the record mode, the output is +3 V in pause and low in start (run).

Since the collector voltage of Q204 and the base voltage of Q203 momentarily fall to the low level by the action of C209 when the power is switched on, Q204 is energized, Q203 is deenergized. The high level control signal from the collector of Q203 is multiplexed with the audio signals, and the mixed signals are sent to the CCU, where the audio signals are separated by C714 in the Process-1 circuit board, and control signal is inverted to the low level by Q725. The resultant control signal is sent to the video tape recorder and makes it in pause.

The high level signal from Q203 is sent via R212 to the cathode of D601 and D601 gose out.

When the clock signal is sent by pulling SW001, the flip-flop is inverted, switching Q203 on. As a result, the low level control signal from Q203 is sent to the CCU, where it is inverted to the high level by Q725. The resultant control signal is sent to the video tape recorder. If the video tape recorder is in the recording mode, it starts recording.

The low-level signal from Q203 is sent via R212 to the cathode of D601 to light the tally lamp. When another clock signal is sent by pulling SW001 again, the flip-flop is inverted, switching Q203 off. As a result, the video tape recorder is stopped, and the tally lamp D601 goes out. D203 and D206 form a circuit to prevent erratic operation. This circuit operates as follows: When the video tape recorder is in other than the recording mode and the high-level signal is supplied to the CCU via Pin 4 of 10 pin VTR/AC adaptor connector, a DC voltage of about +8 V is generated in the CCU, and applied to D203. When the DC voltage runs through the zener diode D206, the base voltage of Q204 is kept at the high level. Therefore, Q203 in the flip-flop circuit is cut off, whereas Q204 is held on. Thus, even if the SW001 switch is pulled to feed a clock signal, the tally lamp of D601 will not light.

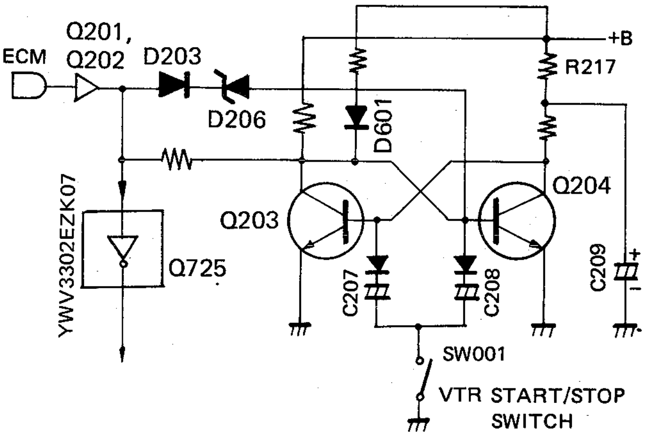


Fig. 2-14

3. Light indicator circuit

This circuit applies the DC voltage, which is generated by rectifying the preamplifier output signal in the camera control unit (CCU), to the four stage comparator IC201, compares it with the four fixed bias voltages, and switches on or off the light emitting diodes for the light intensity indicator.

The Process-2 circuit board (YWV3302EZK08) in the CCU detects video signals, and converts them into DC voltages, which are multiplexed with the horizontal scanning start (Hs) pulse and clamp pulse (CP) by the Process-1 circuit board (YWV3302EZK07) before being supplied to the camera head.

4. Dynamic focus correction circuit

Generally, the focus voltage which brings the beam in the center part of the pickup tube to the best focus is different in level from the voltage which brings the edge portions of the pickup tube to the best focus so that the modulation factor for the center part and the edge portions of the pickup tube differ. When the camera is directed at a evenly illuminated white object the red and blue signals modulated at 3.8 MHz do not have a uniform level and as a result, a color shading appears. Fig.2-15 Ⓐ. The dynamic focus correction circuit supplies horizontal (H) and vertical (V) sawtooth and parabola signals which together with the DC focus voltage applied to the focus grid (grid 4) of the vidicon and focus the electron beam along the entire scanning area to correct for unevenness in modulation factor Fig. 2-15, Ⓑ.

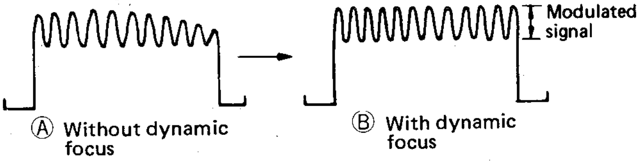


Fig. 2-15 Dynamic Focus

The vertical sawtooth signal from the Deflection circuit board (YWV3301EZK01) is sent from Pin 7 of IC103 to the center terminal of VR203 (V. SAWTOOTH). The vertical sawtooth signal is also integrated by R143 and C123 and the resulting vertical parabola signal is sent to VR204 (V. PARABOLA). The horizontal scanning start (Hs) pulse from the Process-1 circuit board (YWV3302EZK07) is supplied through the camera cable (terminal 9 of the multi-pin connector CN101) to the horizontal sawtooth generator Q206 base, via Q102 which passes Hs but blocks CP pulses. The amplified Hs pulse is integrated by R230 and C213 forming a sawtooth signal, which is fed to the center terminal of VR201 (H. SAWTOOTH) and an integrator consisting of R231 and C214. The R231, C214 integrator converts the horizontal sawtooth into a parabola which is amplified by Q207. The amplified horizontal parabola is fed to the center terminal of VR202 (H. PARABOLA). The dynamic focus correction waveforms are applied to both the base and emitter of Q208, where they are amplified. The collector of Q208 produces an inverted or non-inverted signal depending on the position of the control.

This signal is AC coupled via C405 into G4 vidicon electrode which normally receives the DC focus voltage adjusted by VR401 (FOCUS).

5. Dark shading correction circuit and vidicon blanking mix

The vidicon produces dark current when the light is by a closed lens for example. The dark current is not even along the target structure, but has a shading Ⓒ. The dark shading correction circuit supplies horizontal sawtooth and parabola signals Ⓓ to the vidicon cathode (K) to correct color shading at low illumination levels.

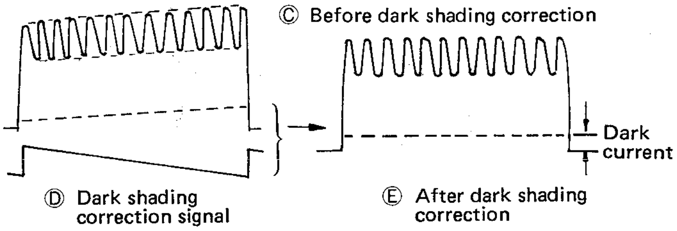

Ⓒ Before dark shading correction
Dark current
Ⓓ Dark shading correction signal
Ⓔ After dark shading correction

Fig. 2-16 Dark Shading Correction

The horizontal sawtooth and parabola signals which are generated by Q206 and Q207 are routed to the center terminals of VR206 (H. PARABOLA) and VR205 (H. SAWTOOTH). These signals are applied to the base and emitter of Q210 respectively, where they are amplified. The collector of Q210 produces a positive or negative correction signal which depends on the position of the potentiometer. The lag compensation signal is also sent to the emitter of Q210, where it is mixed with the dark shading correction signals.

The horizontal scanning start (Hs) pulse is applied to the base of Q216, and the vertical sawtooth signal to the base of Q209 where they are mixed. The H/V mixed signal is applied of Q209/216 to the base of Q211 as a beam blanking signal, which is mixed with the dark shading correction signal before being sent to the cathode (K).

6. 9V regulator circuit

This circuit produces a regulate 9V source from the 10V power supplied from the camera control unit (CCU).

The 10V power from the CCU is applied to the emitter of Q215. Transistor Q212 amplifies the error between the zener reference and its base potential and forwards it to Q215 base through Q213/214. If the Q215 collector potential changes, the base potential of Q212 also changes, and a voltage change appears at its collector. This change is amplified by Q213 and Q214. to control the base current of Q215 in the direction which opposes the voltage change at Q215 collector. As a result, the output voltage remains constant. VR207 is adjusted for 9V at TP201.

5. High Voltage Circuit Board (YWV3301ZK03)

The High Voltage circuit board (YWV3301ZK03) generates all the high voltages needed by the vidicon.

The pulse generator circuit on the Deflection circuit board (YWV3301EZK01) generates pulses whose frequency is one half that of the horizontal frequency (15.734 kHz) with a 50/50 duty cycle. These pulses are amplified by Q301 and Q302, and the amplified pulses are applied to the converter transformer. The secondary winding produces boosted pulses of 160 Vp-p, 350 Vp-p, and 1.2 kVp-p amplitude. The 160 Vp-p pulses are rectified by D305 and fillered by C306 to produce +80V supplied to the dynamic focus correction, dark shading correction and, target control circuits. The 160 Vp-p pulses are also rectified by D306, fillered by C305 to produce −65 V which is supplied to G1 for beam control. The 350 Vp-p pulses are rectified and doubled by C302, D304, D303 and C304, to produce +350V supplied to G2 electrode.

The 1.2 kVp-p pulses are rectified by D301 and D302, and clamped to 350V via D302 to produce 1.55 kV with respect to the cathode. This high voltage is supplied via vidicon socket circuit board (YWV3301ZK04) to G6 electrode.

3. CIRCUIT DESCRIPTION OF CAMERA CONTROL UNIT(CCU)

1. Process-1 Circuit Board (YWV3302EZK07)

The Process-1 circuit board (YWV3302EZK07) has the following circuits.

1) Regulated power supply circuit.
2) Sync generator circuit
3) Interface circuits
4) Optical black correction circuit
5) R-Y_L, B-Y_L modulator circuit
6) Low luminance chroma clip/low chroma suppress circuit
7) High Y level chroma clip, color start delay circuit
8) AGC/H. aperture circuit
9) PAL output circuit
10) Vertical edge signal circuit
11) Burst circuit

1. Regulated power supply circuit

This circuit regulates the 12V D.C. power from the video tape recorder or AC adapter to +10V DC and +5V DC, the two major requirements of the CCU. The +10V is also sent to the camera head as main power via pin 7 of the multi-pin connector, and is further regulated there. The 10V output which supplies most circuits is turned off in the VTR playback mode via the power switching circuit Q713 and the driver/sensor Q714 when a 4V D.C. bias with the video signals are supplied to the CCU. The VTR pause inhibit circuit Q704 and Q705, the startup color preventing circuit Q711, the interface circuit Q702, the 5V regulator circuit (but not reference) Q740, the PAL output circuit Q715, Q716, Q717 and the LED power indicator D715 are all supplied +10V not switched. The +10V to all other circuitly is controlled, and by removing the reference voltage for the 5V regulator Q740, the +5V is also turned off. (See Note 1 in Fig. 3-1).

The 5 V is supplied from the emitter of Q740 via D718 to the sync generator circuit, and via D716 to the R-Y_L and B-Y_L modulator circuits for bias.

The 10 V regulator circuit consists of a voltage control transistor Q736, error amplifiers Q737 and Q738, and a voltage comparator Q739.

The 12 V input power is supplied via the fuse F701 and the power switch SW701 to the emitter of Q736. The output voltage of the collector of Q736 is compared with the reference voltage which is set by D713, and the difference between them causes the collector voltage of Q739 to change. The detected voltage change is amplified by Q737 and Q738 to control the base current of Q736, and thus keep the output voltage constant.

VR706 is a control for 10 V level setting. VR705 is a current limiting control which limits the base current available for Q736

Q713 turns off in the VTR playback mode and will be described later.

Q740, the 5 V regulator receives power from the unswitched +10V, but the current for the Zener diode D714 comes from switched †10V (actually 9.8V) so that the 5 V supply is also controlled by Q713.

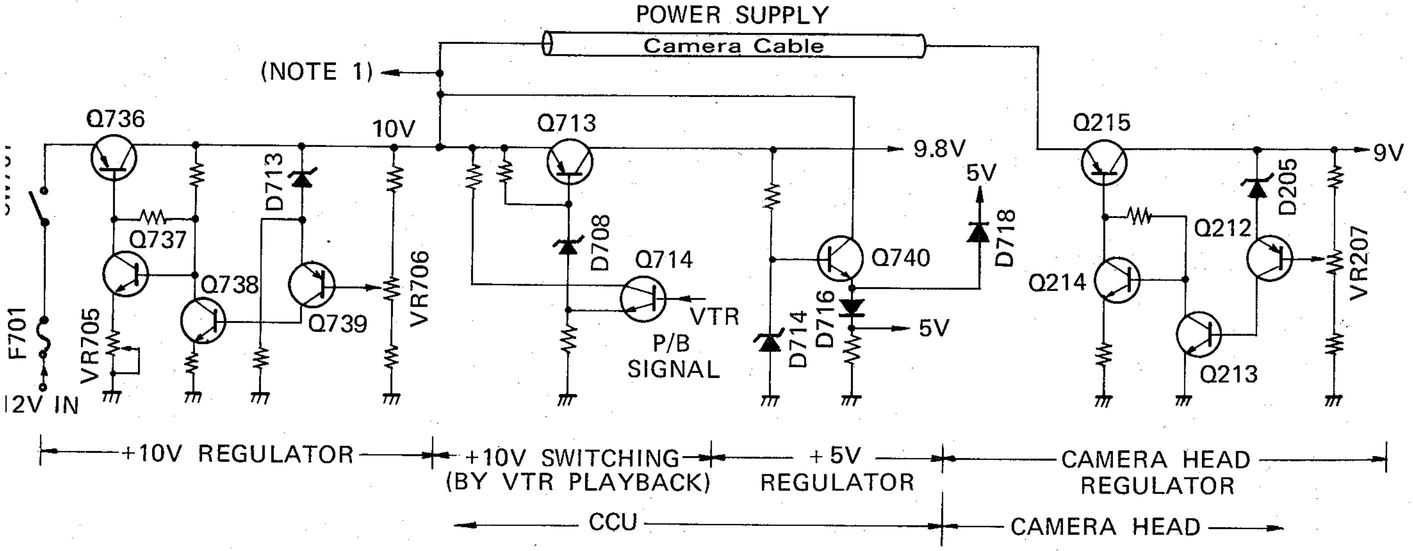


Fig. 3-1 Power Supply Circuit

2. Sync Generator Circuit

This circuit generates horizontal scanning start (Hs) pulse, vertical scanning start (Vs) pulse, wide horizontal drive (pre-blanking) pulse, composite blanking (BL) pulse, composite sync pulse, clamp pulse (CP), burst signal, and subcarrier (SC) signal, and sends them to each circuit board in the camera head and camera control unit (CCU).

The oscillator circuit composed of inverters IC705a and IC705b, crystal oscillator X-tal 1, C763, C772, and VC703 (8.86 MHz OSC) generates a pulse of the frequency of 8.867237 MHz (2fsc : twice the frequency of the PAL subcarrier). This 2fsc pulse is sent via inverter IC705c and amplifier Q749 to Pin 5 of PAL sync generator LSI IC709. The 2fsc pulse is phase-compared in IC709 with the frequency fx generated by the voltage controlled crystal oscillator (VCXO), which is composed of crystal oscillotor X-tal 2, C753, C754 and D719, and which is connected to Pins 14 and 15 of IC709. The phase detected output is sent from Pin 8 of IC709 to the variable capacitance diode D719 in VCXO through the low-pass filter (LPF) consisting of R929 to R931, C760 and C761 to drive D719 and control fx.

This phase lock loop circuit always keeps an interleaving relationship between 2fsc and the horizontal pulse frequency fh generated by IC709. fx is about 2.53MHz. VC703 (8.86MHz OSC) is a control for adjusting 2fsc.

BFP Ⓐ and PAL pulse Ⓑ from Pins 20 and 23 of IC709 are sent via inverters Q750 and Q751, which are for interfacing with TTL, to inverters IC705e and IC705f respectively. The horizontal drive (HD) pulse Ⓒ from Pin 21 of IC709 is supplied to switching amplifier Q748, and a wide HD (pre-blanking) pulse Ⓓ is obtained from its collector by the storage effect of the transistor. This pulse is sent via inverters IC704b and IC704c to each circuit. The Hs pulse Ⓔ from Pin 18 of IC709 runs via IC704e and Q741 to be mixed with CP Ⓕ supplied from Pin 17 of IC709 via IC704f. The mixed signal Ⓖ runs via buffer Q743/Q744 to be mixed with the light indicator control DC voltage which is supplied from the process-2 circuit board via Pin 8 of the multi-pin connector JA, and the mixed signal Ⓗ is supplied via Pin 8 of the multi-pin connector CN701 and through the camera cable to the camera head. The CP and Hs pulses are sent also to other circuits via IC704. The BL pulse Ⓘ from Pin 22 of IC709 is sent to the base of Q720. The sync pulse Ⓙ from Pin 19 is inverted by IC704a, and then mixed with the BL pulse runs via R918. The mixed signal Ⓚ is supplied to the emitter of Q718. Only the vertical sync pulse is taken out of the sync pulse Ⓛ by the integrator which is composed of R795 and C747, and sent to inverter Q742. The vertical sync pulse produed from the collector of Q742 is sent to Q703 in the interface circuit as Vs pulse Ⓜ . The Vs pulse is supplied via inverter Q747 to the process-2 circuit board.

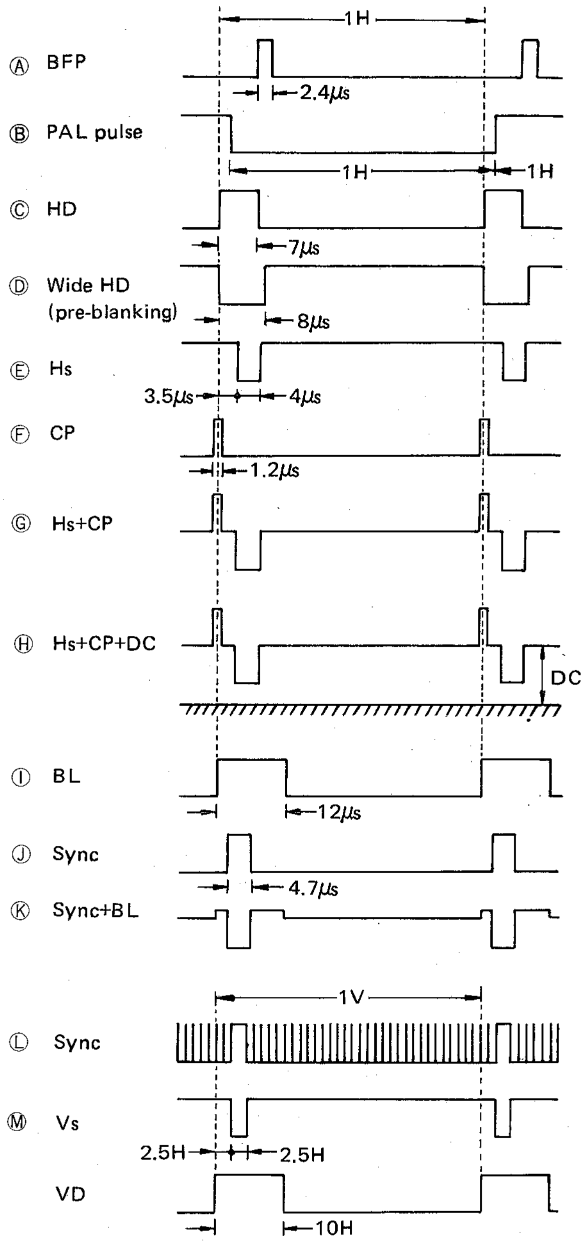


Fig. 3-2 Sync Pulses

The pulse with a frequency of 2fsc (8.867237 MHz) and a duty cycle of 50/50 obtained from Pin 6 of IC705 is supplied to buffer IC707c and inverter IC705d. IC707c and IC705d produce pulses Ⓝ and Ⓞ which are 180° opposite to each other in phase, and sent to J-K flip-flops IC708a and IC708b. The input pulses to IC708 are divided into one half respectively, and Q and $\overline{Q}$ outputs of IC708 produce 4 subcarrier (SC) pulses Ⓟ , Ⓠ , Ⓡ and Ⓢ , which differ 90° each in phase.

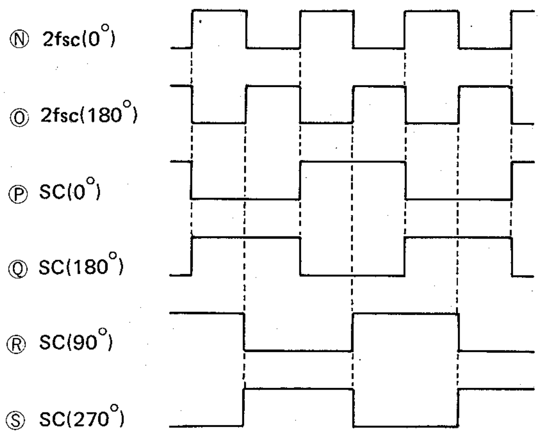

Ⓝ 2fsc(0°)
Ⓞ 2fsc(180°)
Ⓟ SC(0°)
Ⓠ SC(180°)
Ⓡ SC(90°)
Ⓢ SC(270°)

Fig. 3-3 Subcarrier

The 0°-phase SC Ⓣ out of the Q output of IC708a to be supplied to gate IC707a is gated by the PAL pulse Ⓤ which is sent via inverter IC705f from the collector of Q751, resulting in an SC pulse Ⓥ every 1H. The 180°-phase SC Ⓦ out of the $\overline{Q}$ output of IC708a to be sent to gate IC707b is gated by the PAL pulse Ⓧ which is directly supplied from the collector of Q751, resulting in an SC pulse Ⓨ every 1H. SC Ⓥ and SC Ⓨ run through R949 and R946 to be mixed together, and an SC Ⓩ differing 180° in phase every 1H is obtained. This SC is supplied to modulator IC703 as R-Y_L SC. The 270°-phase SC pulse out of the $\overline{Q}$ output of IC708b is sent via buffer IC707d to modulator IC701, and to modulator IC702 as B-Y_L SC.

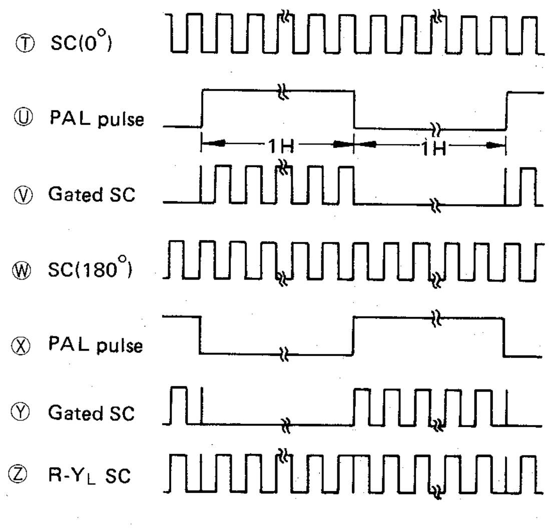

Ⓣ SC(0°)
Ⓤ PAL pulse
1H
1H
Ⓥ Gated SC
Ⓦ SC(180°)
Ⓧ PAL pulse
Ⓨ Gated SC
Ⓩ R-Y$_L$ SC

Fig. 3-4 R-Y_L Subcarrier

The 180°-phase SC Ⓐ′ and 90°-phase SC Ⓓ′ are supplied to gates IC706c and IC706d respectively, and as in the case of R-Y_L SC, gated by PAL pulses (Ⓑ′ and Ⓔ′), which differ 180° in phase from each other, resulting in SC Ⓒ′ and SC Ⓕ′ every 1H. These subcarriers are mixed together by IC706a into an SC Ⓖ′ which differs 90° in phase every 1H. In IC706b, only the burst period of SC Ⓖ′ is gated by BFP Ⓗ′ which is supplied from the collector of Q750 via inverter IC705e, resulting a gated SC Ⓘ′ . The gated SC Ⓘ′ is mixed with BFP Ⓗ′ by R943 and R944, and the mixed signal is supplied via the low-pass filter consisting of L706 and C769 to Q729 as burst signal Ⓙ′.

Q752 is a reset transistor for setting the polarities of subcarriers obtained from IC708a and IC708b.

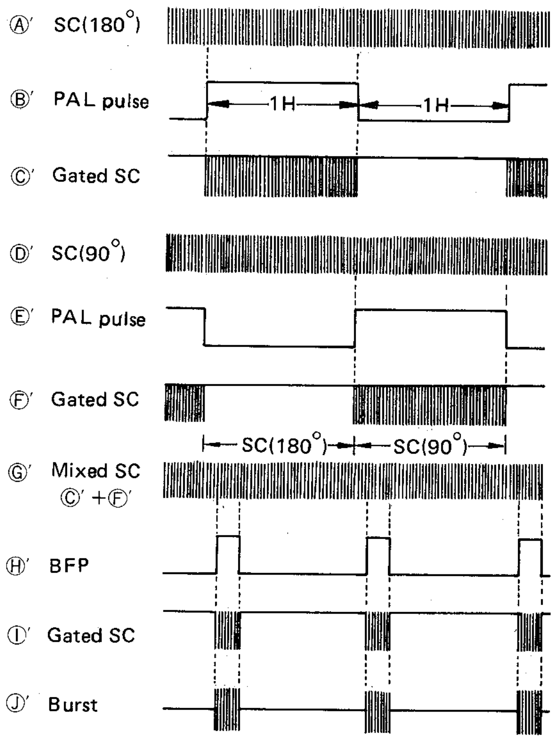
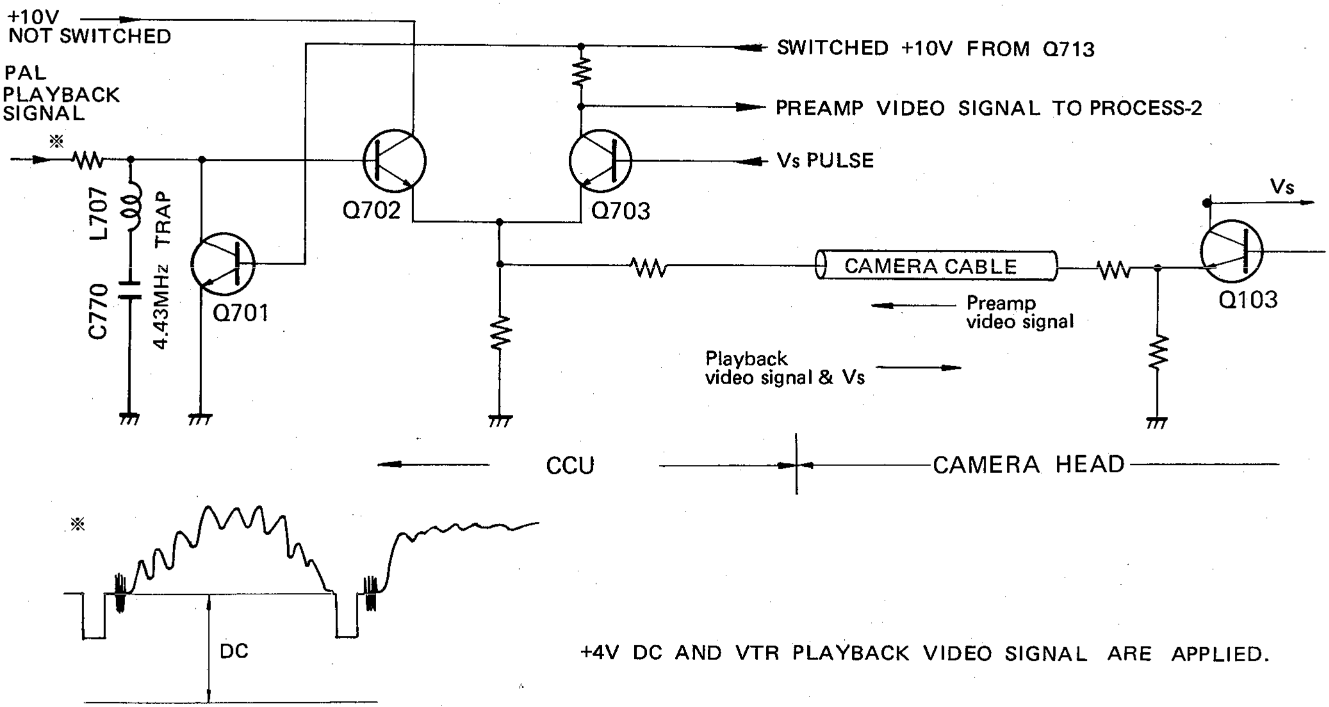

Ⓐ′ SC(180°)
Ⓑ′ PAL pulse
1H
1H
Ⓒ′ Gated SC
Ⓓ′ SC(90°)
Ⓔ′ PAL pulse
Ⓕ′ Gated SC
SC(180°)
SC(90°)
Ⓖ′ Mixed SC
Ⓒ′ +Ⓕ′
Ⓗ′ BFP
Ⓘ′ Gated SC
Ⓙ′ Burst

Fig. 3-5 Burst Signal

3. Interface circuit

The Video Signal Record, Video Signal Playback, and Vertical Scanning Start (Vs) Pulse interface circuit is used between the VTR and the CCU and the Camera Head.



+4V DC AND VTR PLAYBACK VIDEO SIGNAL ARE APPLIED.

Fig. 3-6 Interface Circuit

The video signal interface circuit sends the vertical scanning start(Vs) pulse from the camera control unit (CCU) to the camera head through the video coaxial of the camera cable also feeds clamped video signals from the camera head to the CCU through the same coaxial when the VTR is in the recording mode.

When the video tape recorder is in the playback mode and the playback video signals with a 4V D.C. bias are supplied from the video tape recorder,the playback video signals are sent from the CCU to the camera head for the viewfinder through this same coaxial of the camera cable.

the switching circuit Q701 is switched on since its base is connected to the switched +10V supply. Therefore the base of the playback amplifier Q702 which is connected to the collector of Q701 is grounded so that Q702 is receives no signal. Video signals whose optical black is clamped are applied from the camera head are applied to the common base amplifier Q703 through the camera cable, which amplifies the video signals and sends them out the collector to the Process-2 circuit board (YWV3302EZK08). The vertical scanning strat (Vs) pulse is applied to the base of Q703, where it is amplified. The amplified Vs pulse is sent from the emitter of Q703 to the camera head through the camera cable. The Vs pulse is mixed with the video signals from the camera head, and the mixed signals are applied to the collector of Q703. The mixed signals, however, are unnecessary for the Process-2 circuit board so that they are fully cancelled at the collector by applying a Vs pulse of the opposite polarity through R712 and D701.

If the 4V D.C. bias is mixed with the playback video signal in VTR and supplied to pin 1 of 10 pin VTR/AC adaptor connector, the mixed signals are applied to the base of the switching circuit Q714, and the D.C. bias turns Q714 ON. As a result, the emitter potential rises, and the base potential of the power supply switching circuit Q713 also rises through the zener diode D708, and Q713 is off. Q701 and Q703, which receive power from the collector of Q713, are cut off, and the playback video signals from the video tape recorder are fed to the 4.43 MHz trap L707/C770 (where the chrominance signal is removed) and to the base of Q702. Q702 sends this playback video through the camera cable to the camera head for viewfinder playback. The power source lines of the other circuit boards in the CCU, [the Process-1 circuit board (YWV3302EZK07) and the Process-2 circuit board (YWV3302EZK08)], are connected to the collector of the switching circuit Q713, so that they are cut off in the playback mode. The drive pulses, (the Hs and Vs pulses), are no longer supplied to the camera head so the horizontal deflection circuit, vertical deflection circuit, and the high voltage circuit in the camera head are in turn cut off.

This reduces battery power consumption during DC operation, turns off the vidicon, and performs the required signal switching in the camera head for viewfinder playback (Sync separation and video routing).

4. Optical black correction circuit

The vidicon used this camera has a metallic strip (internal optical black) located at the right side of the target. It is used to interrupt the incoming light and sample the dark current. The optical black correction circuit monitors changes in black level due to dark current drift. Where the dark current detected from the optical black and clamped is used as a reference black level. (Refer to Optical black clamp circuit on page 6.)
However, a difference (Fig.3-7, Ⓐ) may exist between the dark current level detected from the internal optical black and the actual dark current detected from other scanning area portions. Therefore, when the dark current drifts due to temperature variations, a level difference also changes so that the black level becomes undefined.

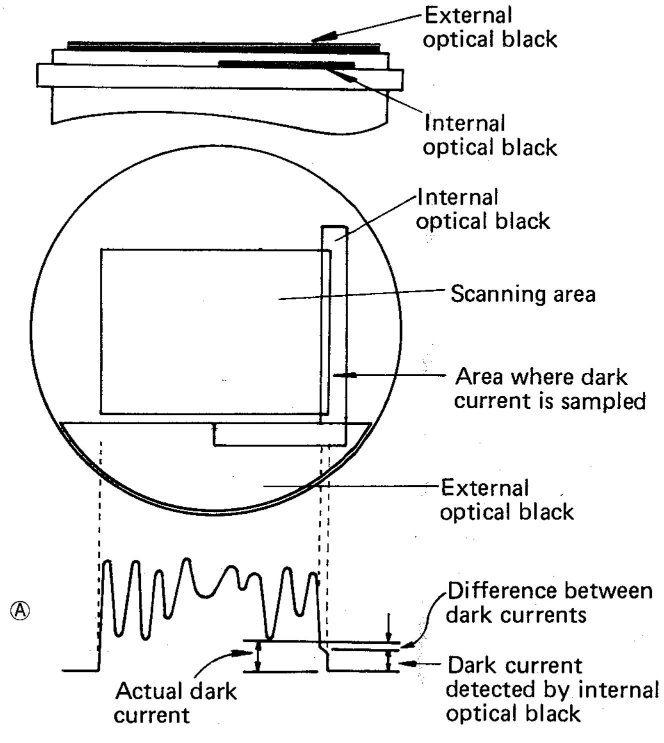

External optical black
Internal optical black
Internal optical black
Scanning area
Area where dark current is sampled
External optical black
Ⓐ
Difference between dark currents
Actual dark current
Dark current detected by internal optical black

Fig. 3-7 Difference of Dark Current

To correct this difference, a wide horizontal drive (pre-blanking) pulse is applied to the base of Q703 through C703 from sync generator circuit and also through VR701 and R713 to the collector of Q703. The output pulse whose amplitude and phase depends on VR701 (Y PED) setting is applied from Q703 collector to the base of Q828 (Process-2 circuit board) i.e. into the Y_H signal before gamma correction path. The result of this signal manipulation is to equalize the OB level (out of the picture area) and the dark current level in the picture area. (See Fig. 3-8).

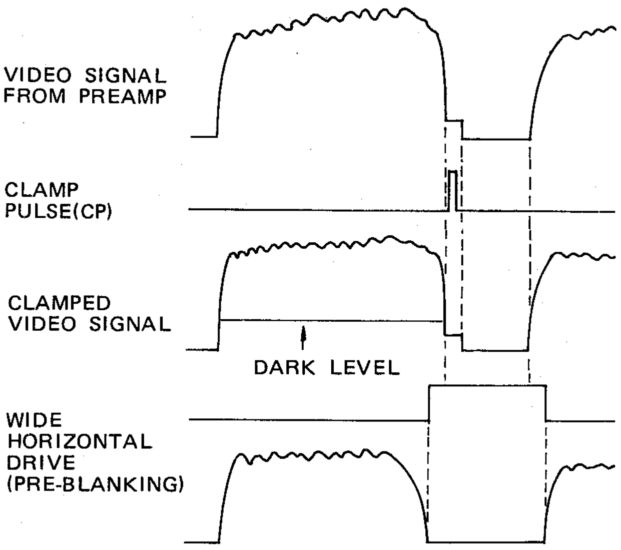

VIDEO SIGNAL FROM PREAMP
CLAMP PULSE(CP)
CLAMPED VIDEO SIGNAL
DARK LEVEL
WIDE HORIZONTAL DRIVE (PRE-BLANKING)

Fig. 3-8 Optical Black Correction Signal

5. R-Y_L, B-Y_L modulator circuit

This circuit matrixes the R, B, Y_L signals and the "color reproduction correction signal" supplied from Process-2 circuit board (YWV3302EZK08) to generate color difference signals R-Y_L and B-Y_L, and modulates these baseband color difference signals on the two subcarriers differing in phase by 90° to generate chrominance signal.
The R-signal supplied by Process-2 circuit board through terminal 2 of the multi-pin connector CJ to Pin 1 of the R-Y_L balanced modulator IC703.
The Y_L-signal and "color reproduction correction signal" supplied through pin 10 and 9 of CJ connector are resistance mixed and applied to Pin 5 of IC703, where the R-Y_L color difference signal is made up by a differential amplifier inside IC703. The R-Y_L signal and the R-Y_L subcarrier supplied from the sync generator circuit is applied to Pin 3 of IC703. The IC produces an AM modulated (suppressed carrier) signal on Pin 7.
Similarly, the B-signal supplied from Process-2 circuit board through terminal 1 of the multi-pin connector CJ to Pin 1 of the B-Y_L balanced modulator IC702. The Y_L-signal and the "color reproduction correction signal" supplied from Process-2 circuit board are resistance mixed, and applied to Pin 5 of IC702 where the B-Y_L color difference signal is manufactured by a differential amplifier inside IC702. The B-Y_L signal and the B-Y_L subcarrier suppied (its pahse differs 90° with respect to R-Y_L subcarrier) from the sync generator circuit undergo suppressed carrier quadrature modulation in the differential amplifier inside IC702.

VR707 (R CARRIER BALANCE) and VR708 (B CARRIER BALANCE) are controls for balancing the DC inputs to IC703 and IC702, thus minimizing carrier leakage.

The R-Y_L signal from Pin 7 of IC703 and the B-Y_L signal from Pin 7 of IC702 are added by R906 and R914 forming the chrominance signal. The chrominance signal level is adjusted by VR709 (CHROMA GAIN) and forwarded to the low-luminance chroma clip, low chroma suppress circuit.

6. Low luminance chroma clip/low chroma suppress circuit

This circuit enhances color reproduction in the low-luminance condition, when the color of the object is faint by improving the white balance.

Chroma signal is forwarded to the emitter of Q734. The signal obtained at the collector of Q734 are split and routed via amplifiers Q733 and Q745 to R779 where they are mixed.

The output circuit consisting of Q731 and Q732 clips chroma when there is no bias current. If the chroma level is less than normal, the base biase of Q731 and Q732 becomes insufficent and the output level is suppressed.

A white-suppressed Y-signal is applied to the base of Q733. Its polarity is such that the current flowing to the collector of Q733 will decrease when luminance is low. In this case the base bias of Q732 also decreases below normal and the chroma signal again is suppressed.

The Y-signal applied to the base of Q733 is cancelled as it reaches the base of Q731, because the signal at the collector of Q733 is opposite in polarity to the signal which comes from the emitter of Q733 and routed via Q745.

Therefore, a Y-signal proportioned to the voltage drop across R779 is applied to the bases of Q731 and Q732, and the clip bias current is modulated according to luminance change.

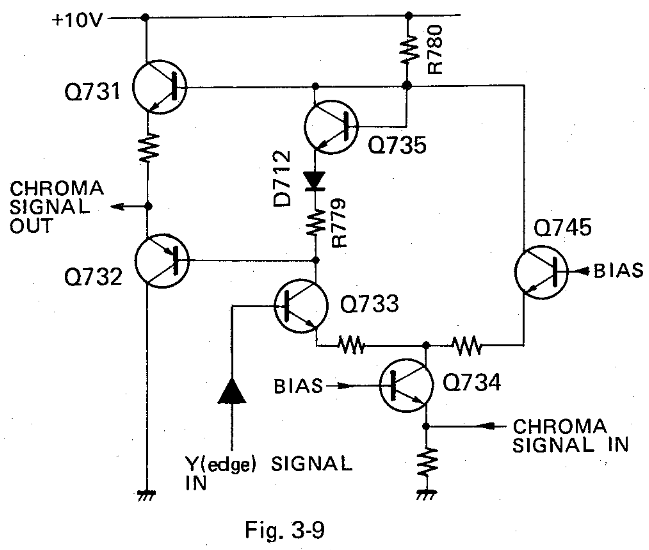


Fig. 3-9

7. High Y level chroma clip, color start delay circuit

- **High Y level chroma clip circuit**

This circuit clips the green color results when an extremely light object is shot with the camera. This is caused by the lack of vidicon beam. When the beam of the vidicon is insufficient to discharge the target due to an excessive light reflected from a brightly illuminated object, the red(R)/blue(B) signal components modulated and riding on top of the green (G) signal become saturated. (Fig.3-10Ⓓ andⒺ).

The Y(degamma) signal from Process-2 circuit board (YWV3302EZK08), which is delayed by L810/C832 in order to register with the chroma signal, is applied to the gate of FET Q712 through Pin 6 of JC connector. Q721 is turned on when Y-signal is high (when a very bright object is scanned).

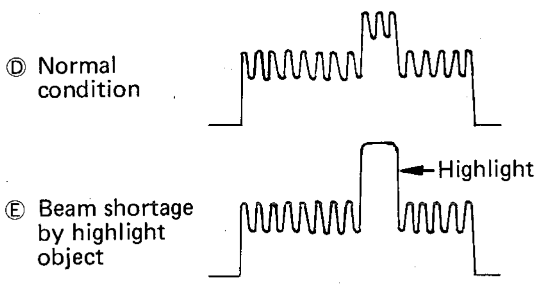


Fig. 3-10 Saturation of R/B Modulated Signal by Beam Shortage

When Q721 is turned ON C718 forms a low impedance part to ground diverting the chrominance signal from Q732/Q731. The chroma is in effect clipped and does not reach the PAL output. If this circuit is malfunctioning, the bright picture parts would turn into an unnatural green color.

- **Color start delay circuit**

When the power is initially turned ON, +10 V is suddenly applied to C716. The resulting transistor (several seconds) current surge turns Q711 ON. The turned ON FET Q711 in effect places C731 and C739 between Q732/Q731 and ground and thus divert the chroma signal for reaching the PAL output.

In the same way a positive wide horizontal drive (pre-blanking pulse is sent from the sync generator circuit to the gate of Q712 to suppress the chroma signals during the blanking period.

8. AGC/H. aperture circuit

The chroma signals mixed with the V. aperture at Q730 are applied to the emitter of the amplifier Q726.

The Y_H-signal from the Process-2 circuit board is applied from Q727 to the emitter of Q726, and through the delay line DL702 to the base of Q726. The Y_H-signals coming through the delay line DL702 are reflected back through DL702, and return to the base of Q727, where they are mixed with non-delayed Y_H-signals.

Therefore, the V. aperture corrected chroma signals are mixed with the H. aperture-corrected Y-signals at the collector of Q726, and the mixed signals are supplied from the collector of Q726 to the AGC circuit.

The aperture-corrected signals are amplified by the differential amplifier Q724. The AGC circuit consists of the differential amplifier circuit Q724, buffer Q722, amplifier Q721, and rectifier circuit D711. The rectifier D711 detects the video signal level, and converts the detected level into a DC voltage, and the DC voltage is fed back to the base of the differential amplifier circuit Q724 to ensure uniform output.

Q723 is a clamp circuit, and the horizontal scanning start (Hs) pulse is applied to its base to clamp the signal during blanking (BL) period.

After the BL clamp, the video signal output of the emitter follower Q721 is negative. The base DC potential is set at about 1.9 V which set the peak clip level for the video signals according to the bias of Q721 (base and emitter). The video signal is fed to the low level clip and on to the PAL output circuit.

VR703 is the AGC level setting control.

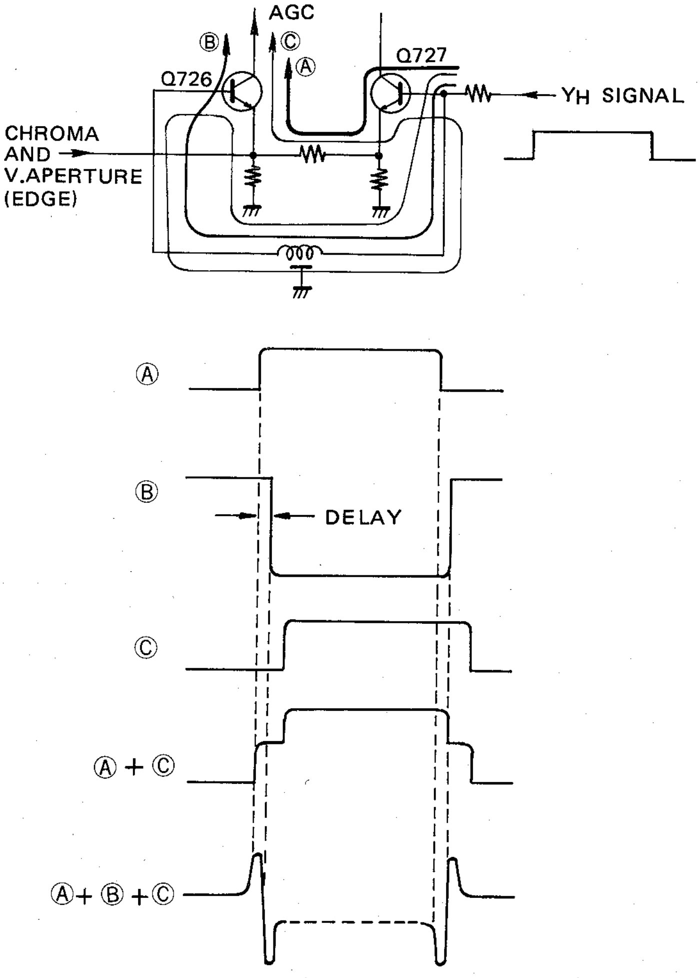


Fig. 3-11 H. Aperture Signal

9. PAL output circuit

The video signal from the AGC circuit and the blanking (BL) pulse from the sync generator circuit (supplied via D710) mix at the base of Q720. The low level (blanking) video signal noise is clipped at the emitter voltage of Q719 (reference level). The video signal with low level clipped is inverted to positive video by the inverter Q718, from drives the push-pull output circuits Q715 and Q716. This is video (PAL) output.

The burst signal from the burst circuit, and composite sync and blanking (for sync and pedestal level correction) from the sync generator circuit are sent to the emitter of Q718, where these three signals are mixed with the video. Q717 and D709 are used for bias current setting and temperature compensation for the push-pull output circuit Q715 and Q716.

10. Vertical edge signal circuit

This circuit generates a vertical edge signal for increasing the vertical resolution.

The Y (edge) signal supplied from the Process-2 circuit board (YWV3302EZK08) is applied to Pin 1 of the modulator IC701. This Y (edge) signal modulates the subcarrier which is applied to Pin 3 from the sync generator circuit. The modulated signal output from Pin 7 of IC701 is sent to the glass delay line DL701 which delays the input signal by 1H line.

The delayed 1H modulated signal is detected by the full-wave rectifier circuit consisting of T701, Q706 and Q707.

The delayed Y (edge) signal from the emitters of Q706 and Q707, is applied to the emitter of Q708, where it is mixed with the undelayed Y (edge) signal applied to the base of Q708 to form a vertical edge signal.

The vertical edge signal is sent to the low pass filter (LPF) consisting of C710, L703 and C711, where the 4.43MHz and harmonics are removed.

The vertical edge signal from the low pass filter is sent via the output amplifiers Q709 and Q710 to the vertical edge mixer Q730 and to the edge correction circuit on the Process-2 circuit board (YWV3302EZK08).

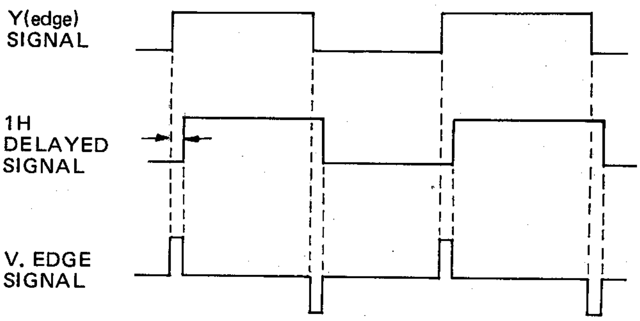


Fig. 3-12 Vertical Edge Signal

11. Burst circuit

This circuit supplies the burst signal required for PAL output signal.

The burst signal is supplied from the sync generator circuit to the low pass filter composed of L706 and C769. After its harmonics are removed by the low pass filter, the burst signal is fed via phase shifter Q729 to the PAL output to be mixed with sync and setup at Q718. VC701 is the burst phase adjustment.

2. Process-2 Circuit Board (YWV3302EZK08)

The Process-2 circuit board (YWV3302EZK08) contains the following circuits.

1) Bias circuit
2) Luminance signal processing circuit
3) Red and Blue signal separation circuit
4) Blue signal processing circuit
5) Red signal processing circuit
6) Shading correction circuit
7) Degamma correction circuit
8) Color reproduction correction circuit

1. Bias circuit

This circuit consists of Q843, Q844 and Q845, and supplies bias voltages to the Process-1 circuit board (YWV3302EZK07) and the Process-2 circuit board (YWV3302EZK08) in the camera control unit (CCU).

2. Luminance signal processing circuit

The positive video signals from the Process-1 circuit board (YWV3302EZK07) go to the buffer Q828 (base), and it provides two output signals. The emitter signal is for the luminance signal circuit and is clamped by the clamp pulse (CP) which is applied to the base of the clamper Q829.

The video signals from the collector of Q828 are sent to red and blue signal separation circuit which will be described later.

The clamped video signal is applied to the buffer Q830 after the color signal component is removed by the 3.8 MHz trap ZT803 a ceramic filter.

The Y video signal from the collector of Q830 is fed to the degamma correction circuit, while the Y video signal from the emitter of Q830 is fed to the gamma correction circuits Q832 and Q833.

Gamma correction is made at 2 points. The low correction point is controlled by VR821.

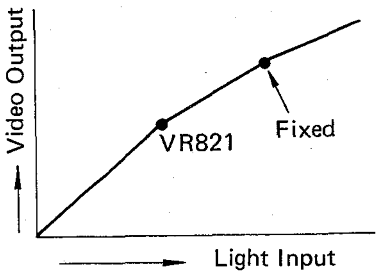


Fig. 4-1

Q831 mixes the wide horizontal drive (pre-blanking) pulse from the Process-1 circuit board (YWV 3302EZK07) with the video signals as a blanking signal. The gamma-corrected video signal is sent to the low-level clip circuits Q834, Q838, and Q839, where the low level portions are clipped. The emitters of Q838 and Q839 produce outputs whose pedestals are clipped as controlled by VR824 (Y_L PEDESTAL) by setting the base voltage of Q839. Q834 clips the signals at the blanking level, and the emitter drives a low pass filter and a phase delay netwark (for chroma-luminance match) consisting of T804, L813, L814, C843, C844, C845 and C846. The video signal now with bandwidth of about 2.8MHz are supplied to the Process-1 circuit board (YWV3302 EZK07) as Y_H signals by the buffer Q842.

ZT804 is a 3.8 MHz trap, which removes any remaining color signal components.

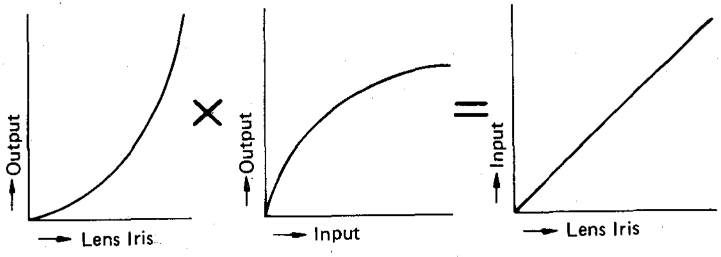
After the pedestal level of the gamma corrected video signal is clipped by the low level clip circuit Q838 and Q839, the video goes to the low pass filter composed of L811, L812, C841 and C842, which filters the video signals into Y_L signals with a bandwidth of 0.5 MHz. The output Y_L signals are buffered by Q841 and sent to the R-Y_L and B-Y_L modulator circuits on the Process-1 circuit board (YWV3302EK07).

The video signal from the emitter of the low level clip circuit Q834 also goes to the white suppressor circuit Q836 and to the buffer Q837.

From the emitter of Q837 this signal is fed to the Process-1 circuit board (YWV3302EZK07) as edge correction [Y (edge)].

- **Light indicator control circuit**

Since the intensity of incoming light to the vidicon varies as the square of the change in lens iris, the level of output signal from the vidicon also changes in approximately the same ratio, as shown in Fig.4-2 Ⓐ. The gamma-corrected signal (Fig.4-2 Ⓑ) is used as an input signal to the light indicator control circuit so that the input signal will change linearly (Fig.4-2 Ⓒ) as the lens iris is operated. Therefore, the DC voltage obtained by rectifying the input signal also varies linearly with lens iris operation so that the light intensity indicator on the viewfinder will light proportionally with lens iris operation.



ⓐ Vidicon ⓑ Gamma Correction ⓒ Light Indicator Control Circuit

Fig. 4-2 Light Indicator

This circuit generates a DC voltage corresponding to the intensity of incoming light on the vidicon to drive the three light emitting diodes (light intensity indicator) on the side of the viewfinder screen.

The video signal with gamma correction and low level clip runs from Q834 to the amplifier Q835. The amplified video signal is sent to the rectifier circuit consisting of D802 and C839, where it is converted into a DC voltage. This DC voltage is passed through the Process-1 circuit board (YWV3302EZK07) and the camera cable to the camera head.

VR822 is the light indicator level setting control and TP810 is the D.C. level test point.

3. Red and Blue Carrier Signal Separation circuit

This circuit removes the modulated red (R) and blue (B) signal from the preamplifier output signal which is composed of a green (G) signal mixed with 3.8 MHz modulated red (R) and blue (B) signals.

The camera signal comes from the collector of Q828 to the 3.8 MHz band pass filter (BPF) which is composed of L803, L804, L805, C821, C822, and C823. The Red carrier (Rc) and Blue carrier (Bc) signals that are taken out of the band pass filter go to the 90° phase shift/buffer circuit Q825 and VC801, and then to the R- and B-signal separation circuits IC802 and IC803.

The blanking period waveforms of the Rc and Bc signals are shaped by the wide horizontal drive (pre-blanking) pulse which is sent from the Process-1 circuit board (YWV3302EZK07) to the wide horizontal drive (pre-blanking) pulse mixer Q824, and their noise in the blanking period is removed.

The output of the emitter of Q825 is sent to a 1H delay line DL801, where it is delayed by one horizontal line. The delayed signal is sent to IC801 for vertical edge correction and the edge corrected signal is sent to T803, and delayed color signals of positive and negative phases are taken out of the secondary winding of T803.

The color signals with positive and negative phases are sent to the differential amplifier IC802 and IC803, where they are mixed with the signals which were not delayed by 1H but were shifted 90° by Q825, thus forming blue and red signals.

VR817 controls the amplitude of the edge correction circuit described in the next section, which also affects the separation of the blue and red signals.

In addition to red and blue carrier signal separation, the differential amplifier IC802 and IC803 perform shading correction and degamma correction which will be described later.

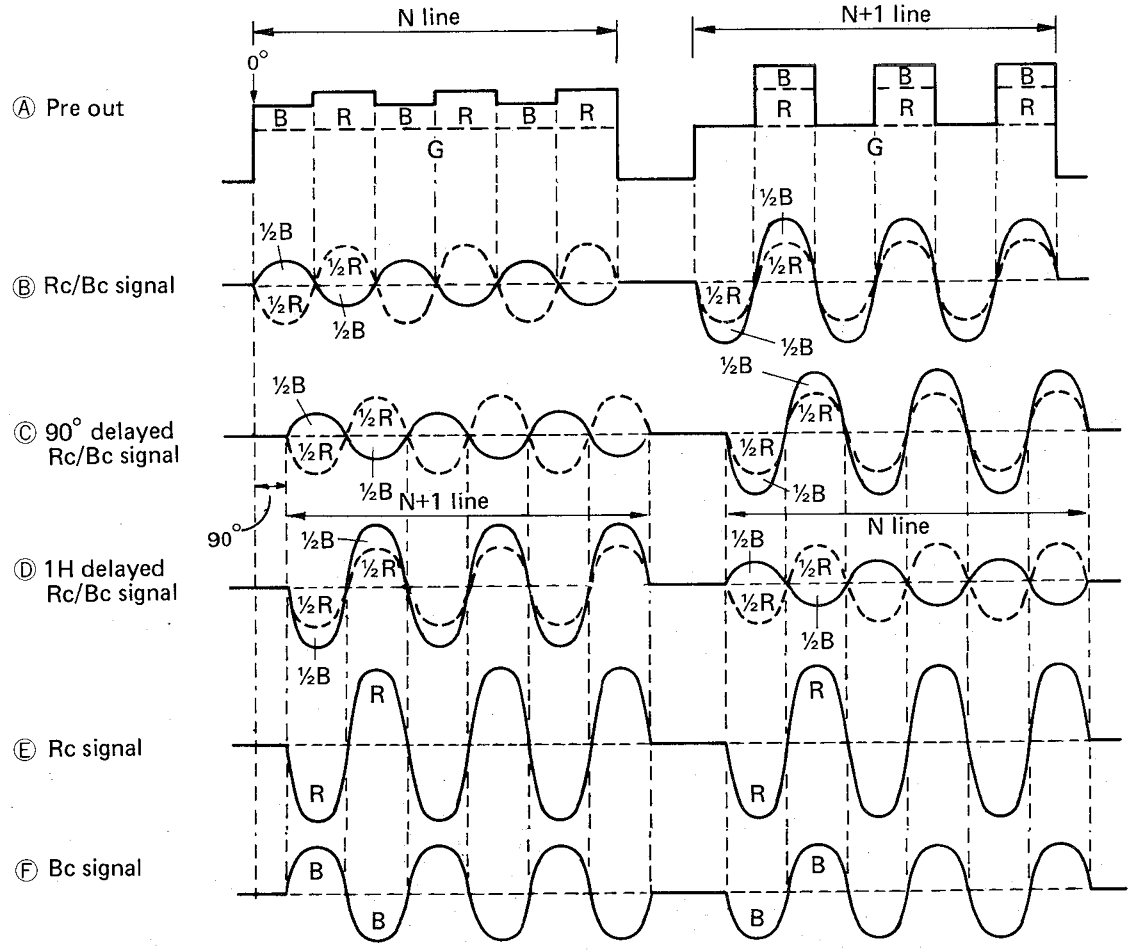


Fig. 4-3 Separation of Rc and Bc Signals

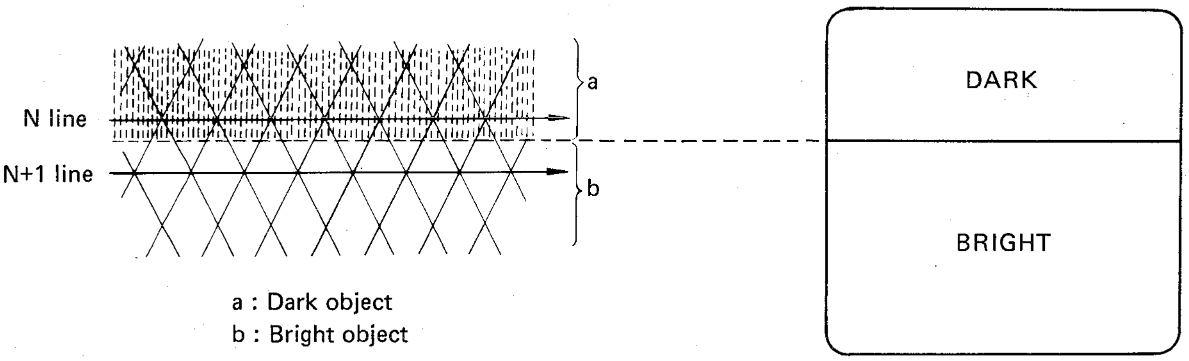
• Edge Correction Circuit

As described above, the Rc and Bc signals are separated from each other by addition and subtraction of the Rc/Bc signal delayed one line (1H) and the Rc/Bc signal not delayed. When an pattern such as shown in Fig 4-4 is seen by the camera, the Rc/Bc signal which is not delayed appears as in Ⓗ, and the Rc/Bc signal delayed one line (1H) becomes as in Ⓘ. Therefore, it is impossible to secure vertical correlation between Rc/Bc signals of N + 1 line, and a "pseudo signal" differing in level of Rc and Bc signals against Y signal Ⓖ is generated. The vertical (V) edge of the object is unnaturally colored by this "pseudo signal". The edge correction circuit controls the level of N + 1 line Rc/Bc signal Ⓚ by controlling the amplitude of signal delayed one line (1H) with the V. edge signal Ⓙ. This provides vertical correlation between Rc/Bc signals (Ⓗ and Ⓚ) prior to color separation.

The vertical edge signal Ⓙ from the Process-1 circuit board (YWV3302EZK07) is sent to the edge correction circuit IC801.

Those parts of the 1H-delayed R- and B-signals (Fig. 4-4) which do not correlate with the R- and B-signals Ⓗ (Not 1H-delayed) are controlled in level by the vertical edge signal Ⓙ .

The vertical edge signal low-frequency component in the R- and B-signals is fed through differential amplifiers within IC801, where it is inverted in polarity and removed from the R- and B-signals.



TV Picture

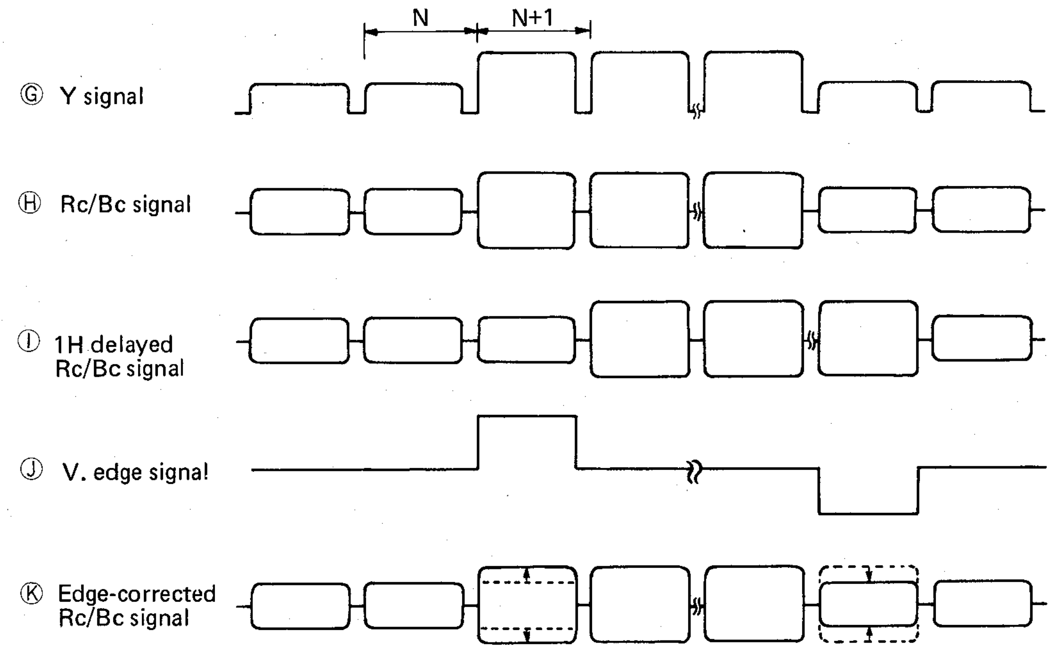
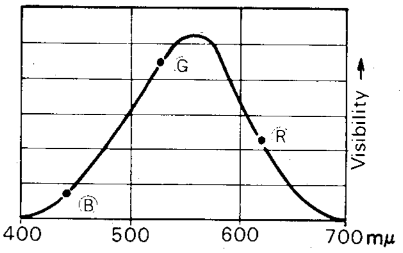


Fig. 4-4 Edge Correction

● White Balance Circuit

Generally, the human eye is sensitive to electromagnetic waves from 380 mμ to 780 mμ in wavelength (the visible region). In addition, the human eye also discerns the wavelength difference as a color difference. The human eye responds to the light between 400 mμ to 500 mμ wavelengths as predominantly blue information, the light between 500 mμ to 600 mμ as green information, and the light between 600 mμ to 700 mμ as red information. The light contained in the entire "visible" range of wavelengths from 380 mμ to 780 mμ is and is "seen" as different amount of white light.



Standard Luminosity Curve

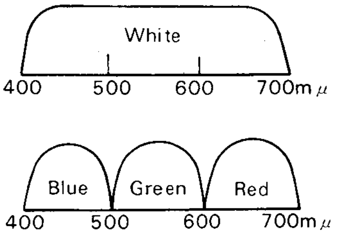


Fig. 4-5 The Visible Sepctrum

● Color temperature

When a carbon is burned, it emits a different light depending on how hot it is. Various natural lights can be expressed in terms of color temperature which may be refered to light emitted from the burning carbon used as a standard. A light source of 3,200°K (K=Kelvin:–273° C corresponds to 0° K in absolute temperature) color temperature implies that it's quality (color) is the same as that emitted from the carbon burning at 3,200° K (2,927° C).

Relationships between the color temperature of light source used for illumination and weather conditions are shown in Fig. 4-6. The color temperature goes up as the weather turns rainy from clear. This may be related to burning carbon (charcoal) as follows. When the charcoal is heated and begins to glow (at low temperature) it emits a reddish light. But when it is so-called white hot (at high temperature), a bluish light is emitted. In other words, the light at low color temperatures is considered reddish and that of high color temperatures is considered bluish.

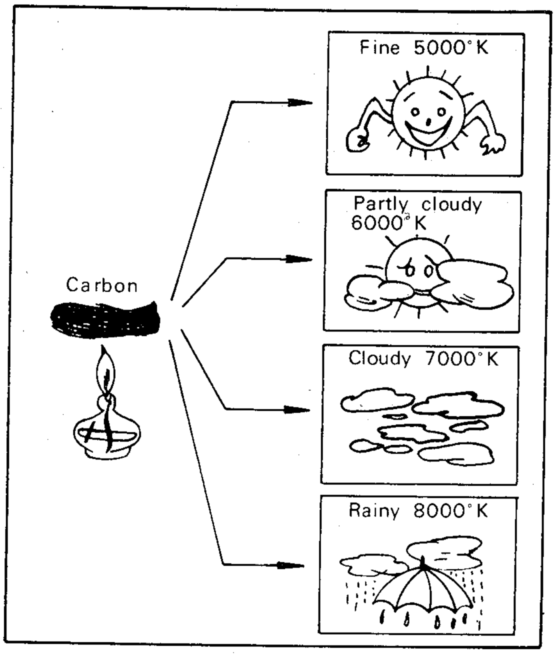
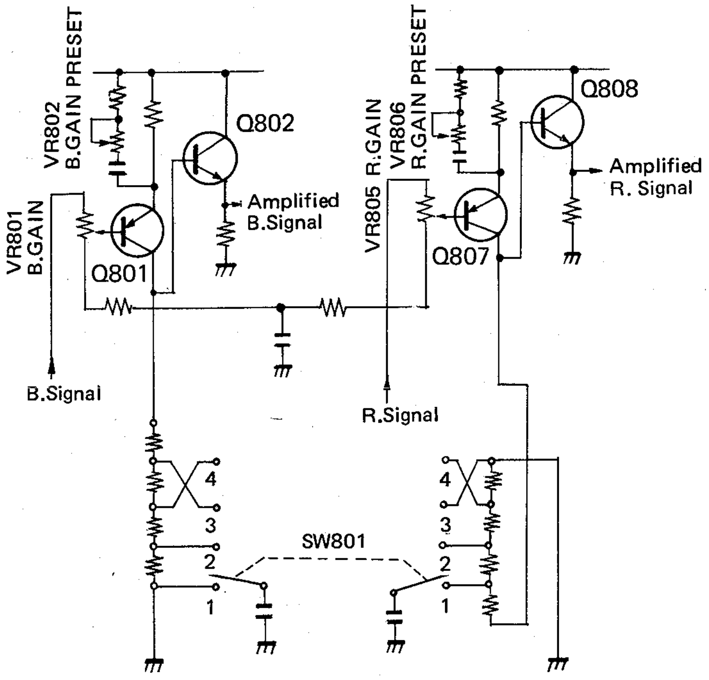


Fig. 4-6 Color Temperature and Weather Conditions

When the color camera is pointed at an object illuminated by a light of low color temperature, it reproduces a reddish picture. When the color camera is pointed at an object illuminated by a light of high color temperature, it reproduces a bluish picture. This camera is so designed that the level of red and blue signals can be changed to meet the color temperature of the light source which illuminates the object in order to ensure proper color reproduction.

The white balance circuit includes ganged switches SW801 (WHITE BALANCE SW) which change the level of red and blue signals in increments while VR801 (B. GAIN) and VR805 (R. GAIN) (outside controls) are provided so that these gains can be gradually varied. VR802 (B. PRESET) and VR806 (R. PRESET) are internal adjustments.

The AC gains of Q801 and Q807 of Process-2 circuit board (YWV3302EZK08) may be changed by SW801 position, changing the level of red and blue signals in steps. When SW801 is set to the DAYLIGHT position the red signal level is maximum and the blue signal level is minimum.



Position of SW801

1. INDOOR (halogen or tangsten lamp)
2. INDOOR (white fluoresent lamp)
3. INDOOR (daylight fluoresent lamp) or OUTDOOR (cloudy day)
4. OUTDOOR (fine day)

Fig. 4-7 White Balance against Color Temperature.

4. Blue signal processing circuit

The blue signal from the modulator IC802 (Pin 7) is applied to the base of Q801, where the blue gain is set by the white balance switch SW801 which switches the load connected to its collector. The amplified blue signal is routed via Q802 to a full-wave detector consisting of T801, Q803 and Q804. This detector which extracts the blue signal produces a 7.6 MHz ripple signal (unwanted). The 7.6 MHz component is removed by a 7.6 MHz ceramic trap ZT801 leaving only the useful blue signal. The resultant blue signal is gamma-corrected by circuits associated with Q805 and Q806 before it is sent to the B-Y_L modulator circuit on the Process-1 circuit board (YWV3302EZK07)

VR801 (B. GAIN) is a control for fine adjustment of the blue signal gain when the color temperature select switch SW801 is set to any of the four desired positions to correspond to illumination used: Indoor halogen or tungsten lamp, fluorescent lamp "Cool" (WHITE), fluorescent lamp (DAYLIGHT), and outdoor daylight.

VR802 (B. GAIN PRESET) is a blue signal level presetting control.

VR804 (B. GAMMA-1) and VR803 (B. GAMMA-2) are gamma correction level setting controls, the first one mainly controlling signal gain in dark parts of the scene and the second controlling the gain of the signal corresponding to highlights.

5. Red signal processing circuit

This circuit uses the same design as the blue signal circuit.

The red signal from the modulator IC803 (Pin 7) is sent to the R-Y_L modulator circuit on the Process-1 circuit board (YWV3302EZK07) via Pin 2 of JC connector after gain control (Q807), detector (T802/Q809/Q810), pedestal control (Q811/Q812), and gamma correction (Q813/Q814).

VR805 (R. GAIN) and VR806 (R. GAIN PRESET) are red gain controls; VR805, a fine adjust operator control; and VR806, a preset control located on the printed circuit board.

VR808 (R. GAMMA-1) and VR807 (R. GAMMA-2) are potentiometers for setting gamma correction.

Q811 and Q812 set the R pedestal.

The red signal pedestal is adjusted by means of VR823 (R. PEDESTAL) to meet the pedestal of the blue signal, which serves as a reference (not adjustable).

6. Shading correction circuit

Even when dynamic focus is applied to grid-4 (G4), the non-uniformity of modulation due to uneven focus on the vidicon target cannot be completely eliminated. (See the description of the dynamic focus circuit on Page 11.) Modulation non-uniformity also occurs due to non-uniform structure in the photoconductive layer of the vidicon (manufacture tolerance). The shading correction circuit which compensates for residual picture shading uses horizontal (H) and vertical (V) sawtooth and parabola signals introduced into IC802 and IC803 (Pins 1 and 5).

This is done as follows.

Q815 is switched by the Vs signal from the Process-1 circuit board (YWV3302EZK07), generating a vertical (V) sawtooth signal using R818, C813 integrator. The vertical sawtooth signal is forwarded to wiper arm of VR810 (V. SAWTOOTH) and VR814 (V. SAWTOOTH). The vertical sawtooth signal at the collector of Q815 is integrated by R821 and C814 (in the collector of Q816) producing a vertical parabola, which is applied to the wiper arm of VR809(V. PARABOLA)and VR813 (V. PARABOLA). Q817 is switched by the Hs signal from the Process-1 circuit board (YWV3302EZK07), generating a horizontal (H) sawtooth signal using R822, C815 integrator. This signal is sent to the wiper arm of VR812(H. SAWTOOTH) and VR816 (H. SAWTOOTH). The horizontal sawtooth signal at the collector of Q817 is integrated by R824 and C816 (in the collector of Q818) into a horizontal parabola, which is applied to the wiper arm of VR811 (H. PARABOLA) and VR815 (H. PARABOLA).

The vertical parabola and sawtooth, and horizontal parabola and sawtooth signals which are applied to the wiper arm of VR809 to VR812 are adjusted for suitable levels (balance or misbalance, whenever is desirable) before they are forwarded to the B signal processing circuit inside IC802 (Pins 1 and 5). IC802, aside from performing other functions, performs signal shading correction.

The vertical parabola and vertical sawtooth, and horizontal parabola and horizontal sawtooth signals which are applied to the wiper arm of VR813 to VR816 are similarly forwarded to the IC803 differential amplifier.

Suppose a uniformly illuminated white object is seen by the camera and the R color component signal has a shading (error) such as that shown in Fig.4-8 Ⓐ. This is sent to pin 3 of IC803 and a color signal delayed by 1H is also applied to the same IC pin 2.

In this case, a shading correction signal Ⓑ is generated by the shading correction circuit set to the proper level during alignment and sent to pin 5 of IC803.

The R signal Ⓐ is modulated by the shading correction signal Ⓑ, and a corrected R signal Ⓒ is produced. The shading correction signal mixed with the R signal Ⓒ is removed by differential amplifiers within the IC, and the two color inputs summed and an R signal Ⓓ is obtained.

The shading correction of the B signal is similar and done in IC802.

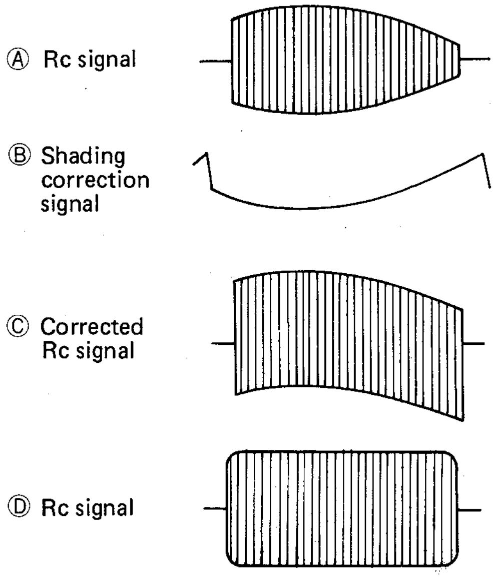


Fig. 4-8 Shading Correction

7. Degamma correction circuit

The vidicon does not have linear photoelectric conversion characteristics, but gamma (γ) characteristics (Fig. 4-9) so that the high level of video signals from the vidicon will be compressed.

Since in this color camera the vidicon produces a 3.8 MHz modulated red (R) and blue (B) signals, mixed with a green (G) signal (see Ⓐ below), the high levels of the modulated R and B. signals obtained by separating the mixed signals are also compressed (Ⓑ).

The degamma correction signal circuit generates a degamma correction signal to compensate for the compression of the high levels of the R and B.signals by the inherent gamma characteristics of the vidicon.

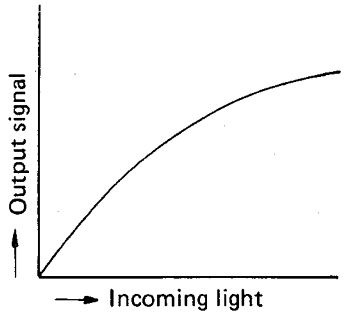


Fig. 4-9 Vidicon's Gamma Characteristic -1

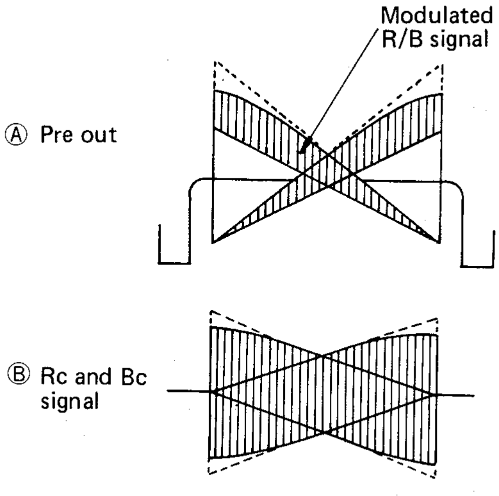


Fig. 4-10 Vidicon's Gamma Characteristic-2

A Y (degamma) signal Ⓒ is fed via the collector of Q830 to the differential amplifiers Q826 and Q827.

The collector of Q826 produces a positive degamma correction signal Ⓓ whose level is higher than the DC voltage set by VR820 (DEGAMMA LEVEL).

This signal is sent to the low pass filter composed of L810 and C832, which adjusts its phase delay to match the R and B.signals, and limits its bandwidth. The signal from LPF, whose level is set by VR819 (B. DEGAMMA GAIN) and VR818 (R. DEGAMMA GAIN), is sent to the modulators IC802 and IC803 as a degamma correction signal for the B and R.signals.

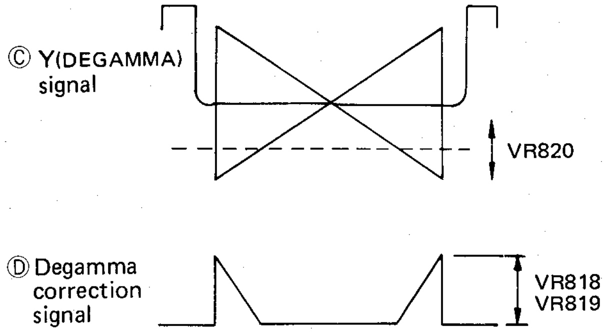


Fig. 4-11 Degamma Correction Signal

If a uniformly illuminated gray scale chart is picked up, and it produces an R signal with its high level suppressed. The R (or B) signals delayed (by 1 H) and undelayed are applied to the IC803 (or IC802) and a degamma correction signal Ⓕ is sent from the degamma correction signal circuit to pin 1 of the IC. The R (or B) signal Ⓔ is modulated by the degamma correction signal to form a corrected R signal Ⓖ The degamma correction signal which is mixed with the R signal Ⓖ is removed by differential amplifiers within the IC and a corrected R signal Ⓗ is obtained.

The degamma correction of the B signal is similar to the above process using IC802 and VR818.

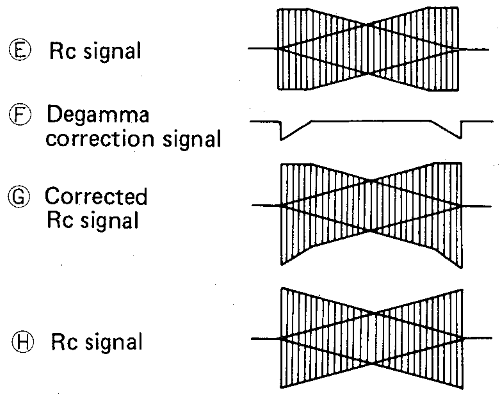


Fig. 4-12 Degamma Correction

8. Color reproduction correction circuit

This circuit corrects colorimetry (particularly red) imperfection resulting from the spectral characteristics of the stripe filter which affects mostly the red and Y_L signals.

The red signal is sent to the base of Q821 and the Y_L to the base of Q820. The signals are subtracted in this differential amplifier stage forming $-(Y_L\text{-}R)$ signal at Q820 collector the mixed output is sent via Q819 collector to the Process-1 circuit board (YWV3302EZK07), as a corrective $-(Y_L-R)$ signal is added to the main $Y_L$signal applied to the SC modulator circuits IC702 and IC703 to correct the Y_L signal. colorimetry of the Q822 and Q823 are used for current stabilization.

4. CIRCUIT DESCRIPTION OF ELECTRICAL VIEWFINDER

The viewfinder circuit board(YWV3304EZK05)consists of a horizontal AFC circuit, a horizontal (H) deflection circuit, a high voltage circuit, a vertical (V) deflection circuit, and a video amplifier circuit.

1. Horizontal AFC Circuit

This circuit consists of a phase comparator Q502, a voltage control oscillator (VCO) circuit Q503 and IC501, driver Q504/Q505, horizontal output Q506, and an integrator circuit R515 and C510. These form a loop circuit.

Negative composite Hs pulse and Vs pulse to be supplied from the camera head are inverted by Q501.

The inverted Hs pulse and Vs pulse are supplied to the horizontal AFC circuit and the V. deflection circuit, respectively. This circuit detects a phase difference between the Hs pulse an;the sawtooth, derived by integrating FBP, with he phase comparator, supplies it to the low-pass filter (LPF) consisting of C506, C507, and R512 for conversion into DC voltage. The VCO circuit consisting of Q503 and IC501 is controlled by the DC voltage from the LPF to generate a 15.73kHz pulse which conincides with the input sync signal at all times in frequency and phase. The VR501 is a control for horizontal holding purposes.

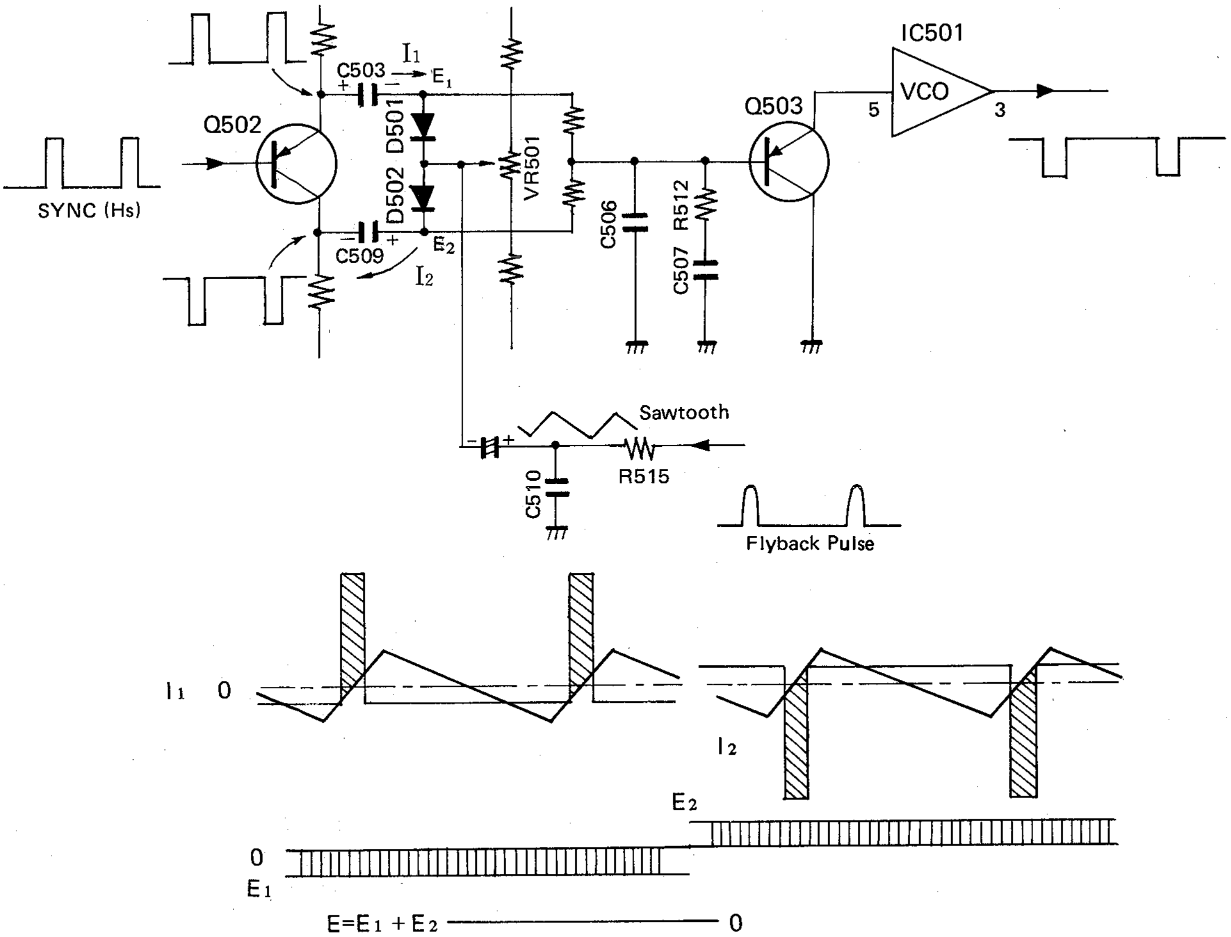


Fig. 5-1 Phase Detector

2. H. Deflection, High Voltage Circuit

The pulse generated by IC501 is used to drive the horizontal output of Q506 via driver consisting of Q504 and Q505. By switching with Q506, a flyback pulse is generated from the flyback transformer (FBT) to step up voltage to a necessary level. The pulse boosted from the secondary side FBT is supplied to the multiplier to obtain high voltage. The anode voltage is increased four-fold by the multiplier to provide about 4.5kV. The voltage of G2 and G3 grids is derived by splitting the voltage one time that of the multiplier by means of a resistors R520 through R525 and VR502. The VR503 is used for control of brightness. The grid voltage of G1 is derived by rectifying the negative pulse from the FBT by D504 and C519, and splitting it by R526, R527, and VR503.

The power supply of the cathode ray tube (CRT) heater is obtained by the pulse voltage to be derived from the secondary side heater winding of the FBT.

The flyback pulse generated in the collector of Q506 is supplied to the H. deflection coil L501 as H. deflection current via C515 and L503. L503 is a coil used for H. deflection size and also serves as a corrector of H.

linearity. D503 is a damper while D505 and D506 are Zenor diodes for voltage limitting, meaning that the diodes are intended for protection of the diodes mounted in the multiplier.

Q511 is a transistor to remove the interference onto the starting portion of the video signal.

3. V. Deflection Circuit

The positive Vs pulse from Q501 is obtained by removing the Hs pulse with the integrator circuit consisting of R528 and C521 and supplied to the V. oscillator Q507 as a trigger pulse. Q507 is a thyristor to generate a sawtooth signal of the frequency which is determined by the time constant of C523, R531, and R532. IC502 is a differential amplifier for amplifying the sawtooth signal supplied to the pin No. 2, and V. deflection current is supplied to the V. deflection coil L501 by pin No. 5.

VR504 is a control for V. size.

4. Video Amplifier Circuit

The video circuit amplifies the pre-out signal supplied from the deflection circuit (YWV3301EZK01) in the camera head, or the playback signal supplied from VTR and supplies the amplified signal to the cathode ray tube (CRT).

The negative video signal is supplied to the common base amplifier Q510 via an amplifier Q509.

The blanking pulse is mixed by Q508 by obtaining V. BL and H. BL from the winding of the secondary-side heater in the FBT. The composite blanking signal thus derived by mixing is supplied to the emitter of transistor Q510 , mixed with the video signal, and then fed to grid 1 via C534 .VR505 is a control for contrasting purposes.

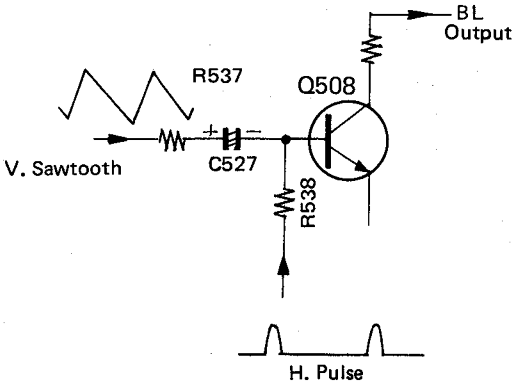


Fig. 5-2 Blanking Mix

Service Manual

Vol. 2

Adjustment Procedures

PAL COLOUR TV CAMERAS

WV-3300E/3310E

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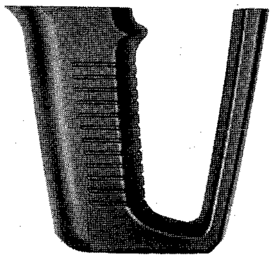
ADJUSTMENT

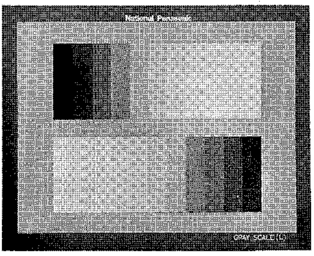
1. Test Equipment Required

The following equipment is required for adjustment of color camera models WV-3300E and WV-3310E.

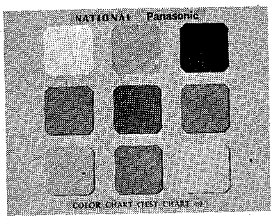
- Oscilloscope
  (dual trace, delayed sweep, 25MHz bandwidth, with three probes, one probe must be 1:1)
- Vacuum tube voltmeter (VTVM) or digital voltmeter (DVM)
- Frequency counter
- Vectorscope
- Color video monitor
- Monochrome underscaned monitor (optional)
- Tripod
- Camera mounting jig for tripod
  (Part No. YWV3300XK50)



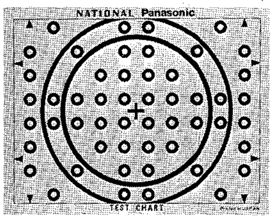
- Lighting [140ft-candles (1400 lux), 3200°K]
- Logarithmic gray scale chart (Part No. YWV2310RB99)


National Panasonic
GRAY SCALE (L)

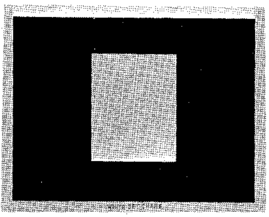
- Color chart (Part No. YWV2100RB98)


NATIONAL Panasonic
COLOR CHART (TEST CHART 4)

- Ball chart (Part No. YWV2100RB03)

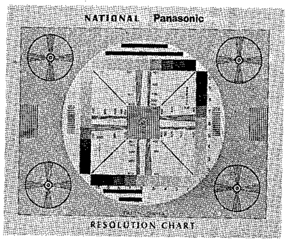

NATIONAL Panasonic
TEST CHART

Front



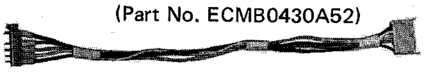
Back

- Resolution chart (Part No. YWV200RB99)

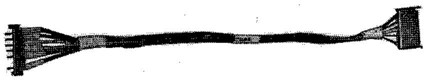

NATIONAL Panasonic
RESOLUTION CHART

- UHF-RCA adaptor (Part No. YWMM-FR-M)
- Extension cables(for adjustment of electronic viewfinder).

(Part No. ECMB0430A52)



(Part No. ECMB0630A52)



2. Disassembling Procedure

2-1 Camera Head Disassembly

- Turn the power OFF.
- Remove the two viewfinder screws. (Fig. 2-1-1)

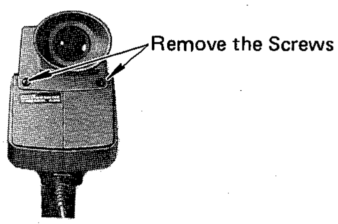

Remove the Screws

Fig. 2-1-1

- Disconnect the two viewfinder connectors. (Fig. 2-1-2)

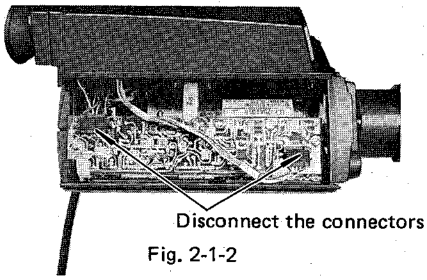

Disconnect the connectors

Fig. 2-1-2

- Remove the three cover screws (Fig. 2-1-3)

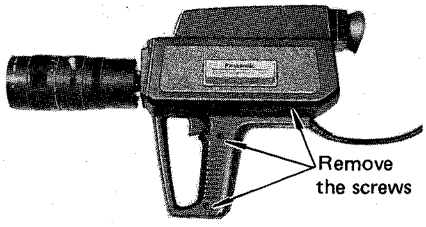

Remove the screws

Fig. 2-1-3

- Remove the two screws which fasten the shading circuit board in the camera head. (Fig. 2-1-4)

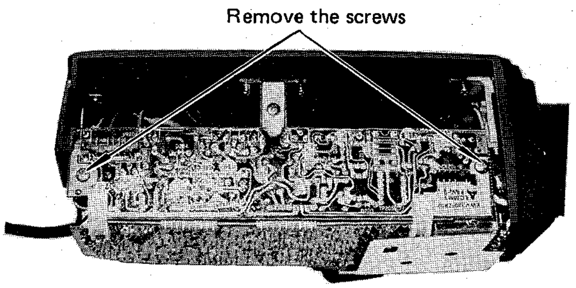

Remove the screws

Fig. 2-1-4

2-2 CCU Disassembly

- Remove the four upper cover screws, and the cover. (Fig. 2-2-1)

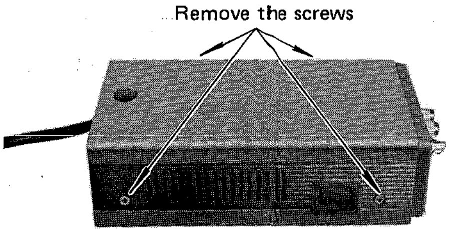

Remove the screws

Fig. 2-2-1

- Remove the two shielding case screws from process-2 circuit board. (Fig. 2-2-2)

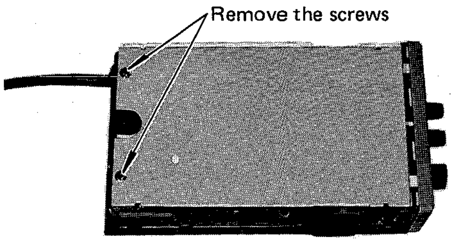

Remove the screws

Fig. 2-2-2

- Remove the front portion of lower cover and slightly push the lower cover backward, and remove the cover. (Fig. 2-2-3)

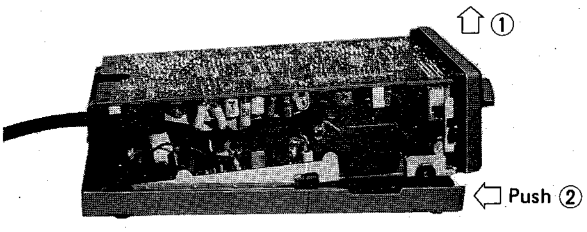


Fig. 2-2-3

- Remove the three shielding case screws from process-1 circuit board. (Fig. 2-2-4)

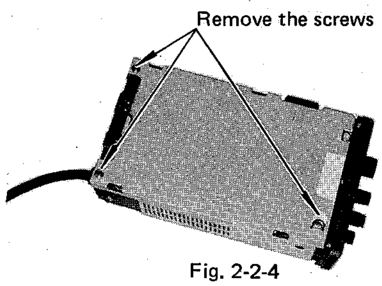

Remove the screws

Fig. 2-2-4

- Remove the three knobs. (Fig. 2-2-5)

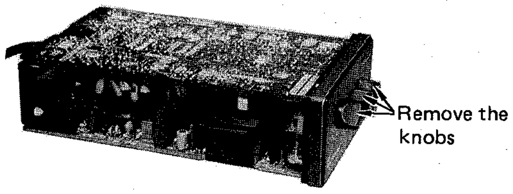

Remove the knobs

Fig. 2-2-5

- Loosen the two screws which hold front cover, and remove the front cover. (Fig. 2-2-6)

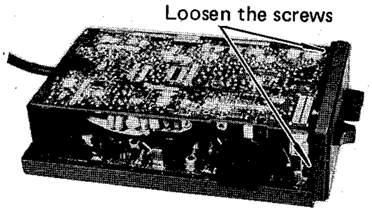
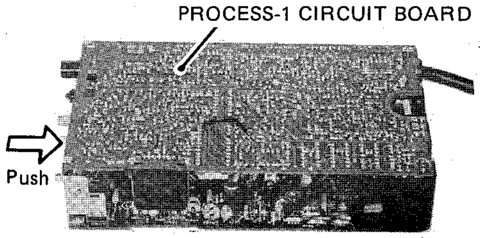

Loosen the screws

Fig. 2-2-6

- Slightly push the process-1 circuit board backward (Fig. 2-2-7) and swing out the Process-2 circuit board. (Fig. 2-2-8)


PROCESS-1 CIRCUIT BOARD
Push

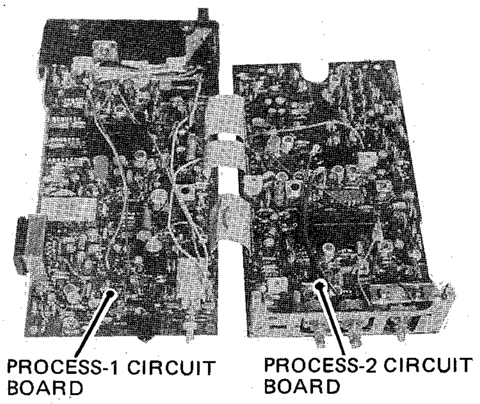

PROCESS-1 CIRCUIT BOARD
PROCESS-2 CIRCUIT BOARD

Fig. 2-2-8

Steps denoted by shaded outlines do not have to be performed if only vidicon is replaced.

3. Adjustment Procedure

3-1 Connection and Setting Up for Adjustment

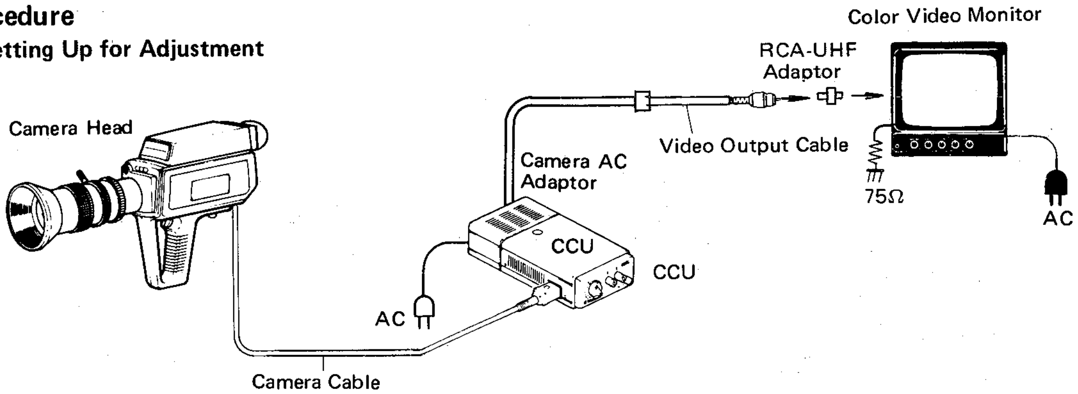


Fig. 3-1-1

- Connection
  - Connect the camera cable from the camera head to the CCU.
  - Connect the cable from the CCU to the AC Adaptor.
  - Connect the video cable from the AC Adaptor to the color monitor.
  - Terminate the color monitor video input in 75Ω.
- Position of Controls and Switches on the CCU
  - Set the controls and switches on the CCU as follows:

    White balance selector switch: Indoor (Halogen/tungsten) position (fully counterclockwise).

    R and B gain controls: Center detent positions.
- Set-up
  - Turn on the color camera for at least 30 minutes prior to adjustment.
  - Light: 140 ft-candles (1400 lux)
  - Test charts: Logarithmic gray scale and a flat white chart.
- Note
  - TP in this manual refers to a test point on the circuit board.

3-2 Power Supply Adjustment

(a) +10V adjustment for CCU

(Process-1 board in the CCU)

Test point:	TP704
Adjust:	VR706 (+10V ADJ.)

- Connect the DVM probe to TP704.
- Adjust VR706 for 10±0.02V.
- If the output voltage does not change when VR706 is turned, set VR705 to a point where the output voltage changes when VR706 is adjusted.

(b) Current limiter adjustment for CCU

(Process-1 board in the CCU)

Test point:	TP704
Adjust:	VR705 (CURRENT LIMITER)

- Connect the DVM probe to TP704.
- Connect a dummy resistor between TP704 and ground (TP-E).
- Use a 18Ω 15W when the system includes a CCU, camera head, and the viewfinder.
- Turn VR705 fully clockwise, measure the voltage, and adjust it to be 20mV below that level.

(c) 9V adjustment for Camera Head

(Deflection board in the camera head)

Test point:	TP201
Adjust:	VR207 (+9V ADJ.)

- Connect the DVM probe to TP201
- Adjust VR207 for 8.9V ±0.02V.

3-3 Sync Generator Circuit Adjustment

(a) 8.86MHz adjustment

(Process-1 board in the CCU)

Test point:	TP710 or Collector of Q749
Adjust:	VC703 (8.86 MHz OSC)

- Connect the frequency counter to TP710 or collector of Q749.
- Adjust VC703 for 8.867237MHz ±10Hz.

3-4. Camera Head Adjustment

- Refer to page 17 for the test points and adjusting controls.

(a) Beam alignment coarse adjustment

Test points: TP802 (B output) } PROC-2 bd
TP804 (R output) }
Adjust: VR401 (FOCUS)···VIDICON SOCKET bd
Alignment magnets·· Coil assembly

- Aim the camera at the white chart. Assure even and sufficient illumination.
- Set the iris at F5.6.
- Turn DYNAMIC FOCUS VR201, VR202, VR203 to mechanical center and VR204 fully clockwise.
- Also turn SIGNAL SHADING VR809 through VR816 on the process-2 circuit board to their mechanical center.
- Connect the oscilloscope to TP802 (B signal) and TP804 (R signal) on the process-2 circuit board.
- Trigger the oscilloscope at H rate (use TP101, DEF bd).
- Adjust FOCUS VR401 so that the center portions of B and R signal waveforms at TP802 and TP804 become maximum. (Fig. 3-4-1)

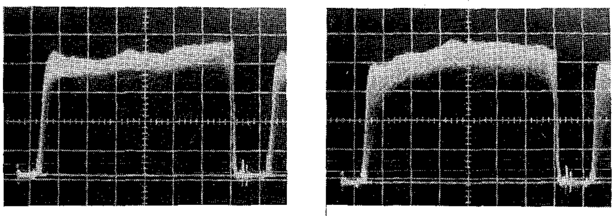


Fig. 3-4-1

- While watching the R and B signals on the oscilloscope, rotate the alignment magnets (see Fig. 3-4-2) and stop when the waveform peaks of R and B signals are same in phase and maximum in amplitude. (Fig. 3-4-3)

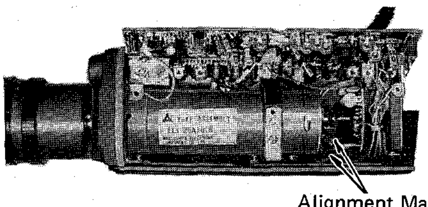


Fig. 3-4-2

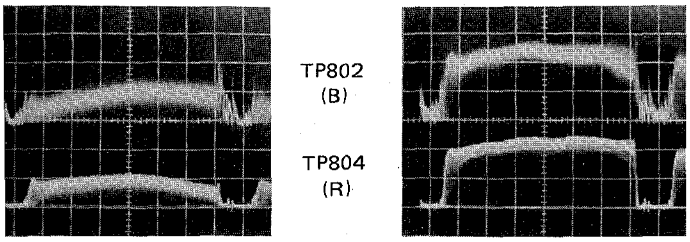


Fig. 3-4-3

- Confirm that the R and B signal waveforms are changed similarly by turning FOCUS VR401. If not, readjust beam alignment.
- Observe the color monitor and adjust for best white balance at the center of the screen, using R and B gain controls on the CCU.
- Adjust FOCUS VR401 for best white balance at the center of the monitor screen.

(b) Dark current setting

Test point: TP103 (Pre-amp output) } DEF bd
Adjust: VR108 (TARGET) }

- Close the lens, wait five minutes before proceeding.
- Connect a 1 : 1 probe to TP103.
- Trigger the oscilloscope at V rate. (use TP102, DEF bd)
- Adjsut VR108 for 24mV. (See Fig. 3-4-4). This corresponds to 25nA of dark current.
- If there is signal shading, adjust the level at the center of the waveform.

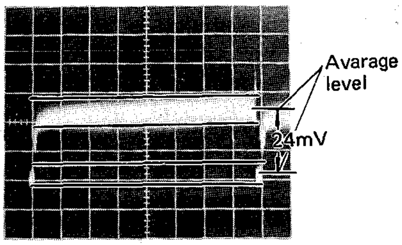


Fig. 3-4-4

(c) Focus coarse adjustment

Adjust: VR401 (FOCUS)··VIDICON SOCKET bd

- Set the iris at F4.
- Aim the camera at the white chart.
- Observe the color monitor, and adjust VR401 for minimum green in the center and maximum magenta (red) throughout the picture area.

(d) Beam current adjustment

Test point:	TP103 (Pre-amp output)	DEF bd
Adjust:	VR109 (BEAM)	

- Aim the camera at the logarithmic gray scale chart.
- Set the iris to F4.
- Evenly illuminate the pattern with 140 ft-candles (1400 lux) of 3200° K light.
- Connect a 1 : 1 probe to TP103.
- Trigger the oscilloscope at H rate. (use TP101, DEF bd)
- With the iris set at F4, read the peak to peak voltage, Vo. (see Fig. 3-4-5)

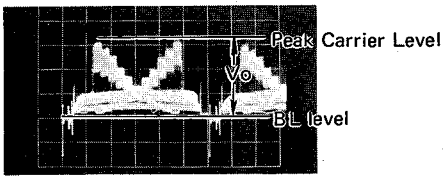


Fig. 3-4-5

- Then, with the iris set at F2, aim the camera at a highlight which causes waveform clipping (compression) at TP103.
- Adjust VR109 until the waveform is clipped at a level equal to 3Vo. If 3Vo exceeds 1.2V, clip at 1.2V max. (see Fig. 3-4-6)

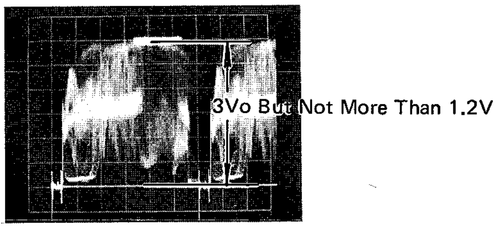


Fig. 3-4-6

(e) Vidicon rotation adjustment

Test point:	Center arm of VC801 ··· PROC-2 bd
Adjust:	Vidicon rotation

- Aim the camera at the white chart.
- Connect the scope to the center arm of VC801 on process-2 circuit board.
- Trigger the oscilloscope at V rate (use TP102, DEF bd).
- Use the delayed sweep mode to line select 2H periods from the center of the waveform. (see Fig. 3-4-7)

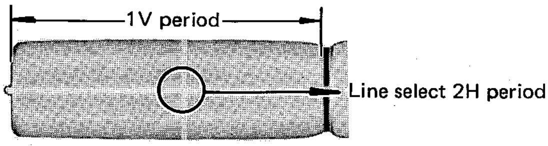


Fig. 3-4-7

- Loosen the vidicon holding screw. (see Fig. 3-4-8)

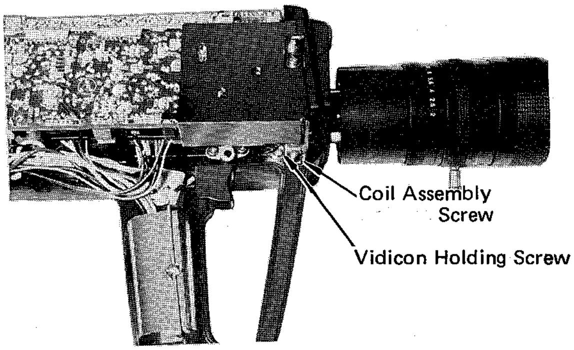
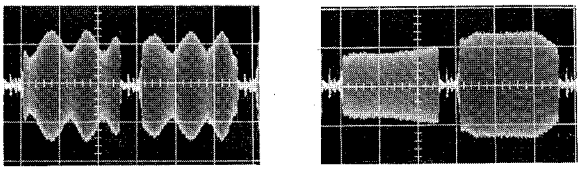


Fig. 3-4-8

- Rotate the vidicon by means of the vidicon socket board (CAUTION! D.C. 1600V!!) and stop at the point where the waveform is flattest (see Fig. 3-4-9).



NO GOOD GOOD

Fig. 3-4-9

- Carefully tighten the vidicon holding screw and make sure that the waveform remains properly adjusted.

(f) Backfocus adjustment

- Loosen the two coil assembly screws located on the front side of the camera. (see Fig. 3-4-8, Fig. 3-4-10)

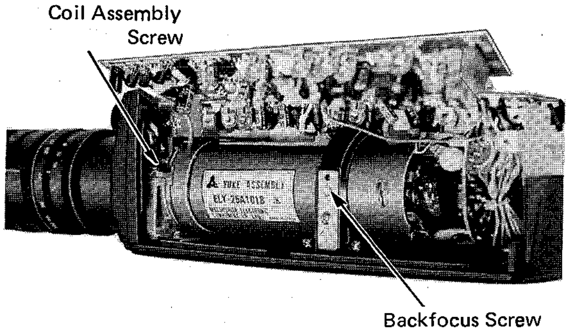


Fig. 3-4-10

- Aim the camera at an object further than 2 meters. Use F2 if possible.
- Zoom in (close up) and adjust the lens focus.
- Zoom out (wide angle) and adjust the focus by turning the backfocus screw. (See Fig. 3-4-10)
- Zoom in again and adjust the lens focus.
- Zoom out again and adjust the focus by turning the backfocus screw.
- Repeat this procedure until the focus tracks throughout the zoom range.
- Tighten the coil assembly screws.

(g) Horizontal size, horizontal linearity and vertical size adjustment

Test points: Center arm of VC801 } PROC-2 bd
TP804 (R output)

Adjust: VR101 (H. SIZE) } DEF bd
VR102 (H. LIN)
VR104 (V. SIZE)

- Aim the camera at the white chart.
- Set the iris to F4.
- Connect the oscilloscope to the center arm of VC801 on the process-2 circuit board.
- Trigger the oscilloscope at V rate (use TP102, DEF bd).
- Use the delay sweep mode to line select 2H periods from the center of the waveform. (see Fig. 3-4-7)
- Adjust VR101 so that the carrier signal at the center arm of VC801 is maximum. (Fig. 3-4-11) (When the carrier signal becomes maximum, the frequency of carrier signal is 3.8MHz.)

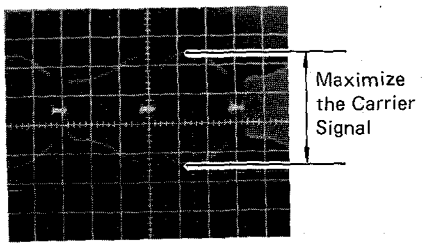


Fig. 3-4-11

- Connect the oscilloscope to TP804.
- Trigger the oscilloscope at H rate(use TP101, DEF bd).
- Adjust VR102 so that the waveform in the starting portion of R signal becomes as flat as possible. (Fig. 3-4-12)

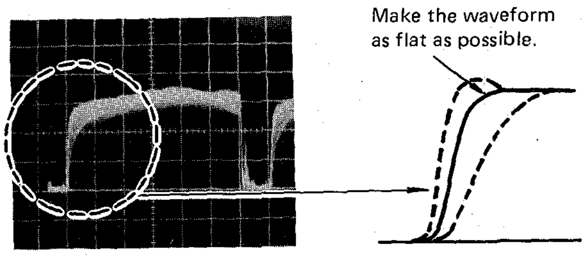
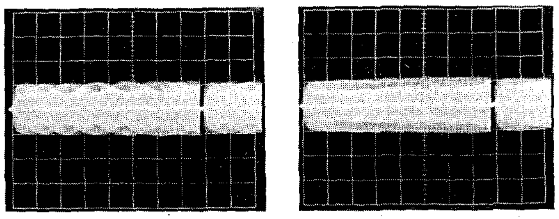


Fig. 3-4-12

- Repeat the above steps until the carrier signal at the center arm of VC801 is maximum and the starting portion of R signal is flat.
- Connect the oscilloscope to the center arm of VC801.
- Trigger the oscilloscope at V rate (use TP102, DEF bd).
- Adjust V. SIZE VR104 for minimum beat during the V period. (Fig. 3-4-16)



NO GOOD GOOD

Fig. 3-4-16

(h) Beam alignment readjustment

- Repeat the adjustment described in step 3–4 (a) on page 4 more carefully.

(i) Vertical centering adjustment

Adjust: VR105 (V. CENT) ······ SHADING bd

- Aim the camera at the white chart.
- Set the iris to F4.
- Use the underscaned monitor for this step, or roll the V hold on the monitor until both sides of V blanking can be observed.
- Turn H. CENT VR103 fully counterclockwise. Note that the optical black clamp may disturb the picture.
- First turn V CENT VR105 fully clockwise and observe the black patch in the upper left-hand corner of the monitor. (see Fig. 3-4-17)
- Turn VR105 back until the black patch just disappears out of the picture area concealed by vertical blanking.

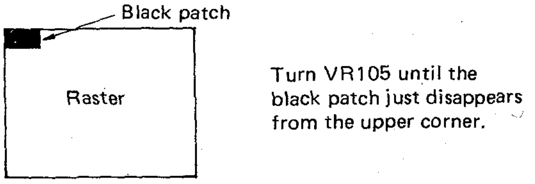

Black patch
Raster
Turn VR105 until the black patch just disappears from the upper corner.

Fig. 3-4-17

(j) Horizontal centering adjustment

Test point: TP103 (Pre-amp output) } DEF bd
Adjust: VR103 (H. CENT)

- Aim the camera at the white chart.
- Keep the iris at F4.
- Connect the oscilloscope to TP103.
- Trigger the oscilloscope at H rate. (use TP101, DEF bd)
- Expand the H blanking period.
- Adjust VR103 until the optical black width is 3.7 μ sec. (Fig. 3-4-18)
- If the falling edge of the waveform corresponding to the picture area is noisy, adjust for the middle.

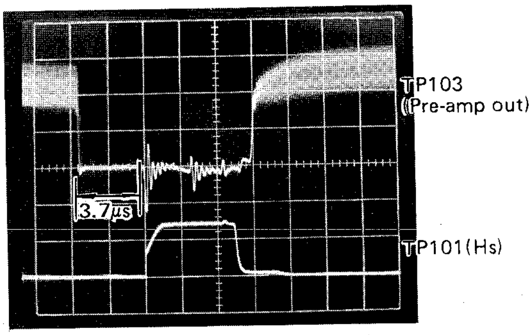
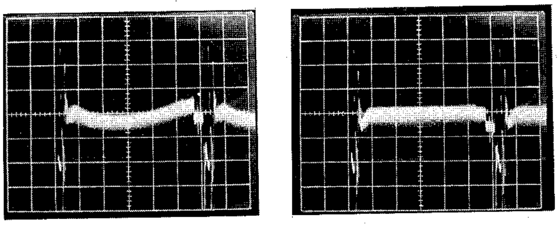


Fig. 3-4-18

(k) Dark shading adjustment

Test point: TP103 (Pre-amp output) } DEF bd
Adjust: VR108 (TARGET)
VR205 (H. PARA) } SHADING bd
VR206 (H. SAW)

- Close the lens. Wait 5 minutes before proceeding.
- Connect the oscilloscope to TP103.
- Trigger the oscilloscope at H rate. (use TP101, DEF bd)
- Turn TARGET VR108 until the dark current is about 40mV.
- While watching the waveform, adjust VR205 and VR206 until the dark current waveform is as flat as possible. (Fig. 3-4-19)



NO GOOD GOOD

Fig. 3-4-19

- After the above adjustment, trigger the oscilloscope at V rate. (use TP102, DEF bd)
- Adjust VR108 until the dark current in middle of the waveform is 24mV. (see step 3-4 (b) page 4 for dark current adjustment.)

(l) Beam current readjustment

Adjust the beam current in the same way as mentioned in step 3-4 (d), page 5.

(m) Dynamic focus adjustment

Test point: TP103 (Pre-amp output) ····· DEF bd
Adjust: VR201 (H. PARA) } SHADING bd
VR202 (H. SAW)
VR203 (V. SAW)
VR204 (V. PARA)
VR401 (FOCUS) ···· VIDICON SOCKET bd

- Aim the camera at the logarithmic gray scale chart.
- Set the iris to F4.
- Connect the oscilloscope to TP103.
- Trigger the oscilloscope at H rate. (use TP101, DEF bd)
- Adjust VR401 for maximum carrier. (Fig. 3-4-20)

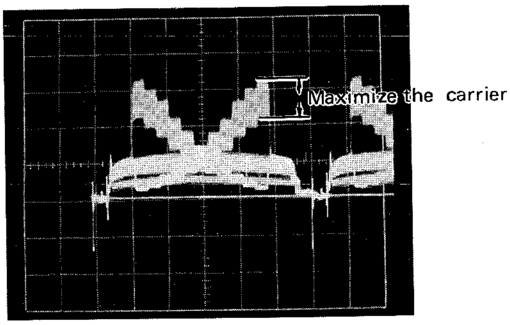


Fig. 3-4-20

- Aim the camera at the white chart. Even lighting is critical for this step.
- Set the iris to F5.6.
- Observe the color monitor and adjust for best white balance at the center of the screen, using R and B gain controls on the CCU.
- Increase color monitor's chroma gain for better viewing. Make sure the monitor is converged properly.
- Adjust VR201, VR202, VR203, and VR204 to minimize green in the corners and edges of the picture. (Fig. 3-4-21)

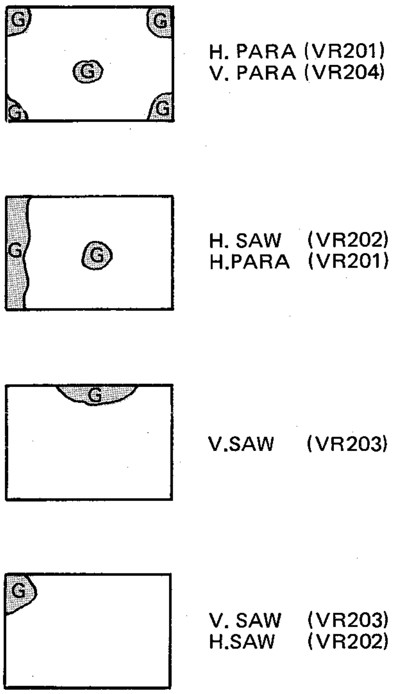

G
H. PARA (VR201)
V. PARA (VR204)
H. SAW (VR202)
H.PARA (VR201)
V.SAW (VR203)
V. SAW (VR203)
H.SAW (VR202)

Fig. 3-4-21

- Overall focus is affected by dynamic focus correction so readjust the focus control VR401 intermittently while performing dynamic correction.
- The object of this adjustment is to optimize focus especially on the sides of the picture.

(n) **Lag correction**

- Requires metronome and black background.

Observe:	Color monitor
Adjust:	VR107 (LAG ADJ) ······ DEF bd

- Aim the camera at a metronome and tape a white patch on the swinging arm.

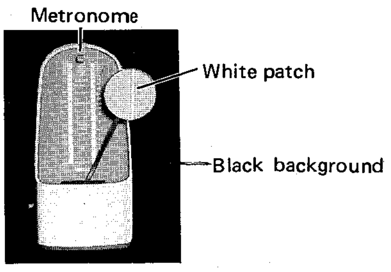

Metronome
White patch
Black background

Fig. 3-4-23

- Set the metronome for a 1.5 sec cycle.
- Set the iris at F5.6.
- While observing the color monitor, increase VR107 (turn clockwise) until a magenta halo appears on the trailing side of the patch as it moves to the left. Reduce VR107 and stop at the point where the magenta halo just disappears. (see Fig. 3-4-24)

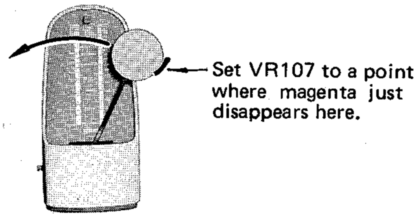

Set VR107 to a point where magenta just disappears here.

Fig. 3-4-24

- ■ This adjustment can be made while panning the camera head right and left. However, the adjustment using a metronome is recommended for more accurate adjustment.

3-5. Camera Control Unit (CCU) Adjustment

- Refer to page 18 for the test points and adjusting controls.
- An illumination of the test charts at 140 ft-candles (1400 lux) and 3200° K is required.
- Use the standard zoom lens.
- Set the controls and switches on the CCU as follows

White balance selector switch: Indoor (Halogen/tungsten) position (fully counterclockwise)
R and B gain controls: Center detent Positions

(a) Input level adjustment

Test point: TP806 ····· PROC-2 bd
Adjust: VR106 (VIDEO GAIN)····DEF bd

- Aim the camera at the logarithmic gray scale chart.
- Set the iris to F4.
- Connect the oscilloscope to TP806.
- Trigger the oscilloscope at H. rate. (use TP705, PROC-1 bd)
- Adjust VR106 so that the voltage between the black chip and the third step is 0.15V. (see Fig. 3-5-1)

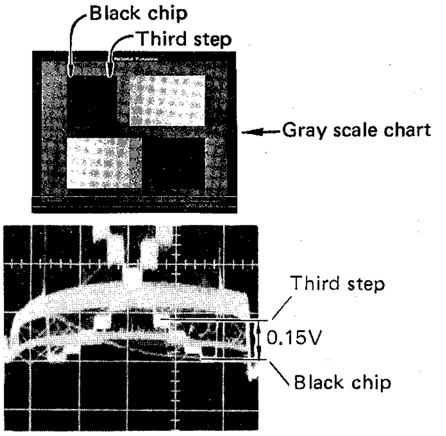
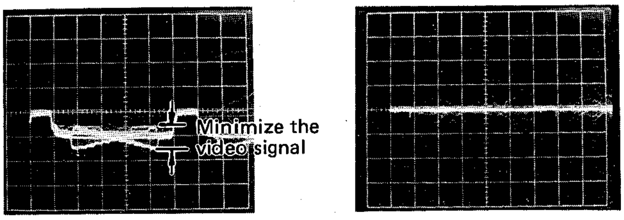


Fig. 3-5-1

(b) Edge balance adjustment

Test point: TP702 } PROC-1 bd
Adjust: VR702 (EDGE BALANCE) }

- Aim the camera at the gray scale chart.
- Set the iris to F4.
- Connect the oscilloscope to TP702
- Trigger the oscilloscope at H rate. (use TP705, PROC-1 bd)
- Adjust VR702 to cancel the video signal. (Fig. 3-5-2)



NO GOOD GOOD

Fig. 3-5-2

Steps denoted by shaded outlines do not have to be performed if only vidicon is replaced.

(c) Y pedestal level adjustment

Test point: TP701 (PAL output) } PROC-1 bd
Adjust: VR701 (Y PEDESTAL) }

- Close the lens.
- Connect the oscilloscope to TP701. (or observe the waveform monitor.)
- Trigger the oscilloscope at H rate. (use TP705, PROC-1 bd)
- Connect a 100μF 16V capacitor between TP703 and ground (TP-E) to remove the chroma component of the signal.
- Wait until the dark level is stabilized after closing the lens and adjust VR701 for a pedestal level of 50mV above the blanking level. (Fig. 3-5-3)

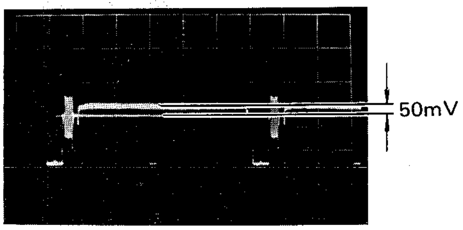


Fig. 3-5-3

- After the adjustment, remove the capacitor.

(d) Y gamma adjustment

Test point: TP807 (YH) } PROC-2 bd
Adjust: VR821 (Y GAMMA) }

- Aim the camera at the logarithmic gray scale chart.
- Set the iris to F4.
- Connect the oscilloscope to TP807.
- Trigger the oscilloscope at H rate. (use TP705, PROC-1 bd)
- Adjust VR821 until the picture black to white waveform component is 0.33V. (Fig. 3-5-4)

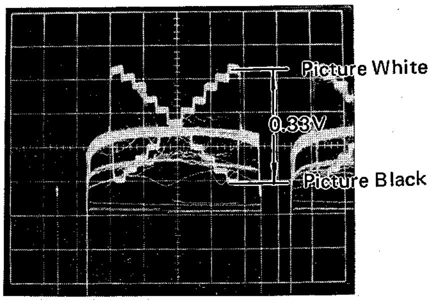
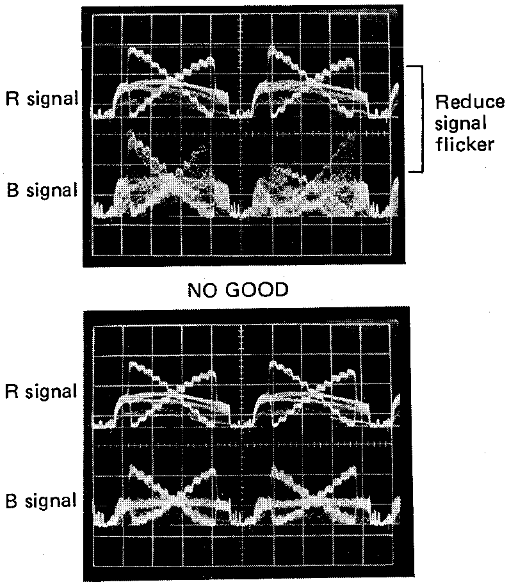


Fig. 3-5-4

(e) R and B signal separation adjustment

Test points:	TP802 (B output) TP804 (R output)	PROC-2 bd
Adjust:	VR817 (R/B SEPARATION) VC801 (R/B SEPARATION)	

- Aim the camera at the logarithmic gray scale chart.
- Set the iris to F4.
- Connect the oscilloscope to TP802 (B) and TP804 (R).
- Trigger the oscilloscope at H rate. (use TP705, PROC-1 bd)
- Adjust the trimmer capacitor VC801 for minimum waveform flicker (especially at TP802-Blue). (see Fig. 3-5-5)
- Adjust VR817 for the same condition.
- Adjust VC801 and VR817 alternately until the flicker in both waveforms is minimum.



NO GOOD

GOOD

Fig. 3-5-5

(f) Signal shading adjustment

Test points:	TP802 (B output) TP804 (R output) TP805 (Y_L output) TP809 (Matrix output)	PROC-2 bd
Adjust:	VR809 (B–V. PARA) VR810 (B–V. SAW) VR811 (B–H. PARA) VR812 (B–H. SAW) VR813 (R–V. PARA) VR814 (R–V. SAW) VR815 (R–H. PARA) VR816 (R–H. SAW)	

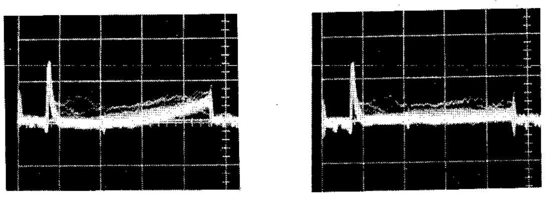
- Connect a 100µF 16V capacitor between TP809 and ground (TP-E) to defeat the Y_L-R color reproduction circuit.
- Aim the camera at a white chart.
- Set the iris to F5.6.

■ R signal shading adjustment

- Connect the oscilloscope to TP805 (ch 1) and TP804 (ch 2).
- Invert ch 2 (TP804) on the oscilloscope.
- Set the scope to the ADD mode and observe the Y_L-R signal thus produced.

(1) R signal horizontal shading adjustment

- Trigger the oscilloscope at H rate, (use TP705, PROC-1 bd)
- Adjust R–H. PARA VR815 and R–H. SAW VR816 to make the waveform as flat as possible. (Fig. 3-5-6)

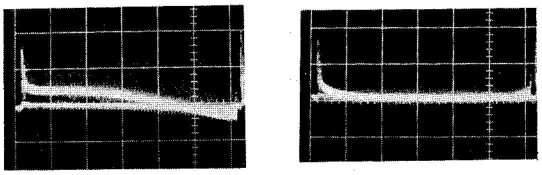


NO GOOD GOOD

Fig. 3-5-6

(2) R signal vertical shading adjustment

- Trigger the oscilloscope at V rate. (use TP709, PROC-1 bd)
- Adjust R–V. PARA VR813 and R–V. SAW VR814 to make the waveform as flat as possible. (Fig. 3-5-7)



NO GOOD GOOD

Fig. 3-5-7

- Reset the Invert/normal ch2 switch (scope) to Normal, and to the Alternate mode.

■ B signal shading adjustment

- Connect the oscilloscope to TP805 (ch1) and TP802 (ch2).
- Invert ch2 (TP802) on the oscilloscope.
- Set the scope to the ADD mode and observe the Y_L-B signal thus produced.

(1) B signal horizontal shading adjustment

- Trigger the oscilloscope at H rate.(use TP705, PROC-1 bd)

- Adjust B–H. PARA VR811 and B–H. SAW VR812 to make the waveform as flat as possible. (Fig. 3-5-8)

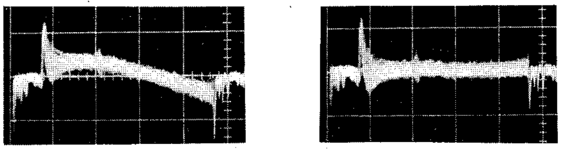

NO GOOD GOOD

Fig. 3-5-8

(2) **B signal vertical shading adjustment**

- Trigger the oscilloscope at V rate. (use TP709, PROC-1 bd)
- Adjust B–V. PARA VR809 and B–V. SAW VR810 to make the waveform as flat as possible. (Fig. 3-5-9)

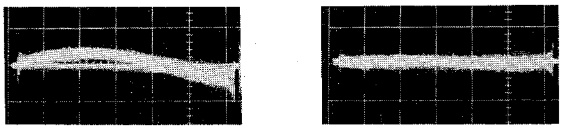

NO GOOD GOOD

Fig. 3-5-9

- Reset the Invert/normal ch2 switch (scope) to Normal, and to the Alternate mode.
- Keep the capacitor on for the next adjustments.

(g) **YL-B signal tracking adjustment**

Test points:	TP802 (B output)	PROC-2 bd
	TP805 (YL output)	
Adjust:	VR802 (B GAIN)	
	VR804 (B GAMMA-1)	
	VR803 (B GAMMA-2)	
	VR824 (YL PEDESTAL)	

- Aim the camera at the logarithmic gray scale chart.
- Keep the capacitor connected as in the previous step.
- Set the iris to F5.6.
- Connect the oscilloscope to TP802 (B signal) and TP805 (YL signal). (Fig.3-5-10)

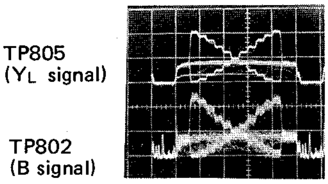


Fig. 3-5-10

- Trigger the oscilloscope at H rate. (use TP705, PROC-1 bd)
- Overlay the YL signal and the B signal on the oscilloscope, and adjust B GAIN VR802 so that the signals match in the lower half of the gray scale. (Fig. 3-5-11)

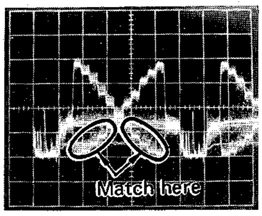


Fig. 3-5-11

- Next, observe the upper half of the gray scale, and adjust B GAMMA-1 VR804 to match the B signal with the YL signal. (Fig. 3-5-12)

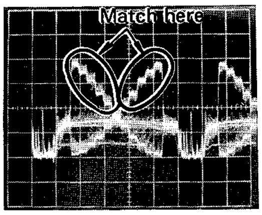


Fig. 3-5-12

- Adjust the YL pedestal using VR824 to match the B signal pedestal. (Fig. 3-5-13)

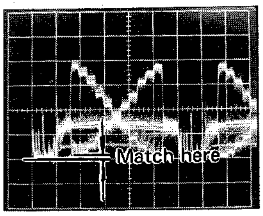


Fig. 3-5-13

- Next, set the iris to F4.
- Observe the upper half of the gray scale, and match the B signal to the YL signal using B GAMMA-2 VR803. (Fig. 3-5-14)
- Repeat the above steps until the YL and B signals match.

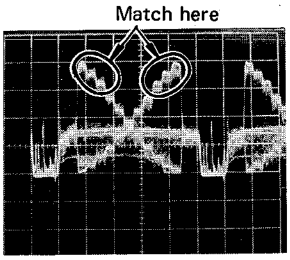


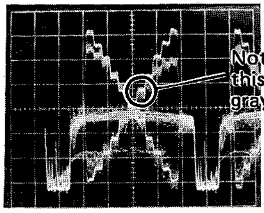
Fig. 3-5-14

(h) **B signal degamma adjustment**

Test points:	TP808 (Degamma)	PROC-2 bd
	TP802 (B output)	
	TP805 (YL output)	
Adjust:	VR819 (B DEGAMMA)	
	VR818 (R DEGAMMA)	
	VR820 (DEGAMMA)	

- Aim the camera at the logarithmic gray scale chart.
- Keep the capacitor connected as in the preceding step.
- Set the iris to F2.
- Connect the oscilloscope to TP802 (B signal) and TP805 (YL signal) (as in the preceding step).
- Trigger the oscilloscope at H rate. (use TP705, PROC-1 bd)
- Turn B DEGAMMA VR819 until B signal is minimized, Turn VR818 fully in the reverse direction.

- Compare the YL and B signals, and note the step at which the B signal no longer tracks with the YL signal. (Fig. 3-5-15)



Note the point at which this occurs in terms of gray scale step number.

Fig. 3-5-15

- Remove the probe from TP802 and connect it to TP808, and adjust DEGAMMA VR820 until the lowest step above the baseline is the same step as that which was noted in the preceding adjustment.(see Fig. 3-5-16)

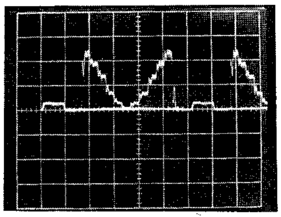


Fig. 3-5-16

- Return the probe from TP808 to TP802.
- As the iris is varied alternately between F2.8 and 2.0, adjust VR819 for the best match at higher steps of the waveform. (Fig. 3-5-17)

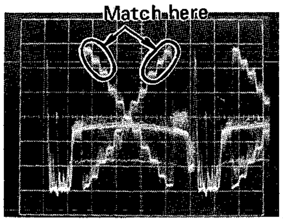


Fig. 3-5-17

- If the YL and B signals do not track satisfactorily, repeat the degamma adjustment.

(i) YL-R signal tracking adjustment

Test points:	TP804 (R output)	PROC-2 bd
	TP805 (YL output)	
Adjust:	VR806 (R GAIN)	
	VR808 (R GAMMA-1)	
	VR807 (R GAMMA-2)	
	VR823 (R PEDESTAL)	

- Keep the capacitor connected as in the previous step.
- Aim the camera at the logarithmic gray scale chart
- Set the iris to F5.6.
- Connect the oscilloscope to TP804 (R signal) and TP805 (YL signal). (Fig. 3-5-18)

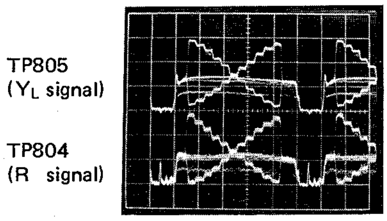


Fig. 3-5-18

- Trigger the oscilloscope at H rate. (use TP705, PROC-1 bd)
- Overlay the YL signal and the R signal on the oscilloscope, and adjust R GAIN VR806 so that the signals match in the lower half of the gray scale. (Fig. 3-5-19)

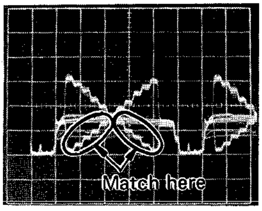


Fig. 3-5-19

- Next, observe the upper half of the gray scale, and adjust R GAMMA-1, VR808 to match the R signal with the YL signal. (Fig. 3-5-20)

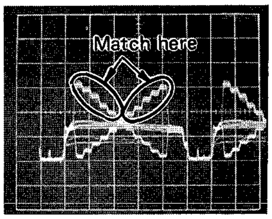


Fig. 3-5-20

- Adjust the R pedestal using VR823 to match the YL pedestal. (Fig. 3-5-21)

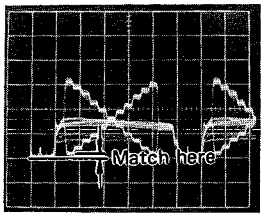


Fig. 3-5-21

- Set the iris to F4.
- Observe the upper half of the gray scale, and match the R signal to the YL signal using R GAMMA-2 VR807. (Fig. 3-5-22)

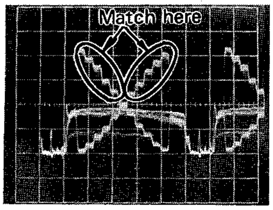


Fig. 3-5-22

- Repeat the above steps until the YL and R signals match.

(j) R signal degamma adjustment

Test points:	TP804 (R output)	PROC-2 bd
	TP805 (YL output)	
Adjust:	VR818 (R DEGAMMA)	

- Keep the capacitor connected as in the preceding step.
- Aim the camera at the logarithmic gray scale chart.
- Set the iris to F2.
- Connect the oscilloscope to TP804 and TP805.

- Trigger the oscilloscope at H rate. (use TP705, PROC-1 bd)
- As the iris is varied between F2.8 and F2, adjust R DEGAMMA VR818 for the best match at higher steps of the waveform. (see Fig. 3-5-23)

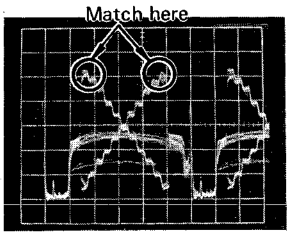


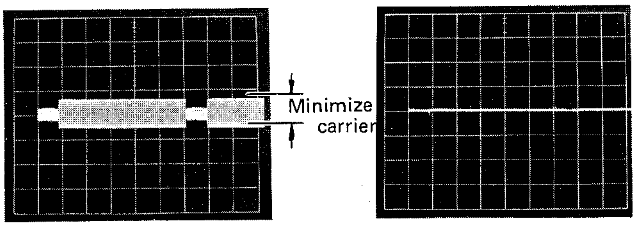
Fig. 3-5-23

- Disconnect the capacitor from TP809 after this step is completed.

(k) **Carrier balance adjustment**

Test point:	TP703 (Chroma output)	PROC -1 bd
Adjust:	VR707 (R-YL CARRIER BALANCE) VR708 (B-YL CARRIER BALANCE)	

- Close the lens.
- Connect the oscilloscope to TP703.
- Trigger the oscilloscope at H rate. (use TP705, PROC-1 bd)
- Adjust VR707 (R-YL CARRIER BALANCE) and VR-708 (B-YL CARRIER BALANCE) alternately until the 4.43MHz carrier component is reduced to a minimum. (Fig. 3-5-24)



NO GOOD GOOD

Fig. 3-5-24

(l) **PAL video level adjustment**

Test point:	TP701 (PAL output)	PROC-1 bd
Adjust:	VR703 (AGC SET)	

- Aim the camera at the logarithmic gray scale chart.
- Set the iris to F4.
- Connect the oscilloscope to TP701.
- Trigger the oscilloscope at H rate. (use TP705, PROC-1 bd)
- Adjust VR703 for 0.71V from the blanking level to the top step of the gray scale. (Fig. 3-5-25)

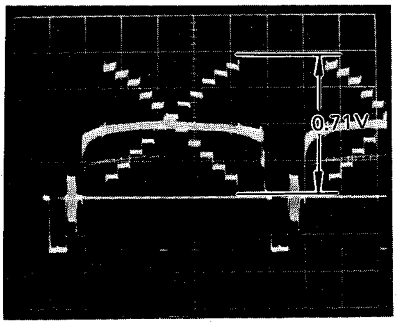


Fig. 3-5-25

(m) **Burst phase and chroma gain adjustment**

Observe:	Vectorscope	
Adjust:	VR709 (CHROMA GAIN) VC701 (BURST PHASE)	PROC-1 bd

- Aim the camera at the color chart.
- Set the iris to F4.
- Connect PAL output into a terminated vectorscope.
- Adjust CHROMA GAIN VR709 so that the RED is equal to 130% as compares to the burst signal. (see Fig. 3-5-26)
- Adjust the BURST PHASE VC701 so that the phases of RED vectors (Nth and N+1st line) become same against the B-Y axis. (see Fig. 3-5-26)

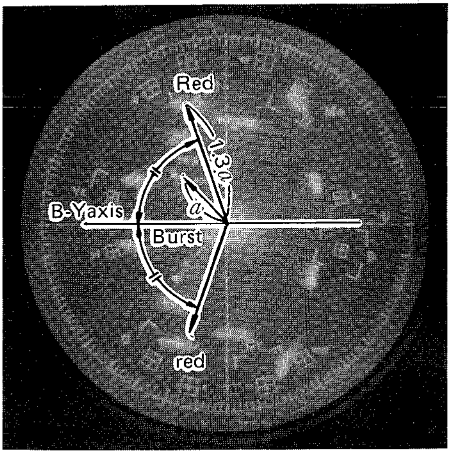


Fig. 3-5-26

(n) **Indicator level adjsutment**

Test points:	TP205, TP206	··· SHADING bd
Adjust:	VR822	·············· PROC-2 bd

- Aim the camera at the logarithmic gray scale chart.
- Set the iris to F4.
- ■ Adjustment with DVM
- Connect a DVM between TP205 and TP206. Adjust VR822 until the voltage between TP205 and TP206 becomes zero. At the same time, confirm that the middle LED lights.
- ■ Adjustment without DVM
- Adjust VR822 so that the middle LED lights. As the lens is opened 1F-stop (F2.8), the upper and middle LED should be lit. Also when the lens is closed 1F-stop (F5.6), the lower and middle LED should be lit. If this is not true, fine adjust VR822.

3-6 Viewfinder Adjustment

- The camera head and the CCU must be completely aligned before viewfinder adjustments are made.
- The conditions and connections for viewfinder adjustment are the same as shown in Fig. 3-1-1 .
- Connect the extension cables.
  (Part No. ECMB0430A52 and ECMB0630A52)

■ **Disassembly**

- Remove the two screws. (See Fig. 3-6-1)
- Remove the shield plates by unsoldering them from the viewfinder board with a soldering iron. (See Fig. 3-6-1, Fig. 3-6-2)

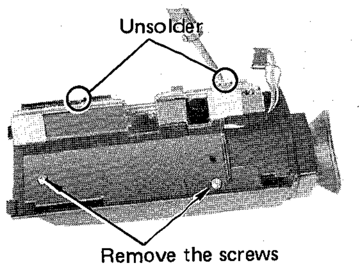


Fig. 3-6-1

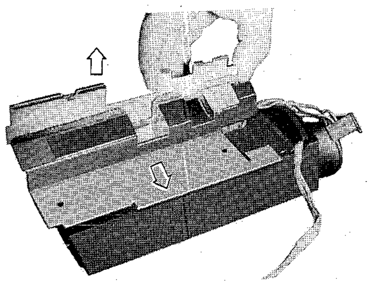


Fig. 3-6-2

■ **Adjustments**

Refer to page 17 for the adjusting controls.

a) Horizontal hold adjustment

- Aim the camera at a ball chart (on the back of the window chart).
- Set the iris to F4.
- Adjust VR501 to a mid-point of horizontal hold lock range.

b) Reduce picture size using L503 (H SIZE) and VR504 (V SIZE)

c) Centering magnets adjustment

- Aim the camera at the ball chart.
- Adjust the centering magnets (See Fig. 3-6-3) until the center of picture (+) comes to the center of viewfinder raster. (Fig. 3-6-4)

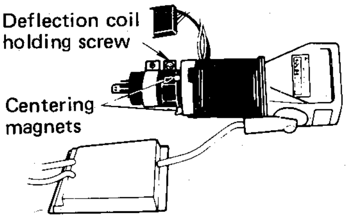


Fig. 3-6-3

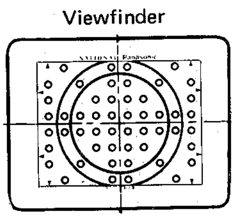


Fig. 3-6-4

Steps denoted by shaded outlines do not have to be performed if only vidicon is replaced.

d) Horizontal and vertical size adjustment

Adjust: L503 (H. SIZE)
VR504 (V. SIZE)

- Aim the camera at the ball chart, and line up the reference arrow heads with the edges of the raster (blanking) on an underscaned monitor. (Fig. 3-6-5)
- Set the iris to F4.
- Adjust L503 to a point where the ball chart's left bright edges just disappear on the viewfinder (see Fig. 3-6-5)
- Confirm that the picture increases by same amount on both sides.
- Then adjust VR503 so that the circle in the chart is nearly a true circle.
- Confirm that the picture increases by same amount on top and bottom.

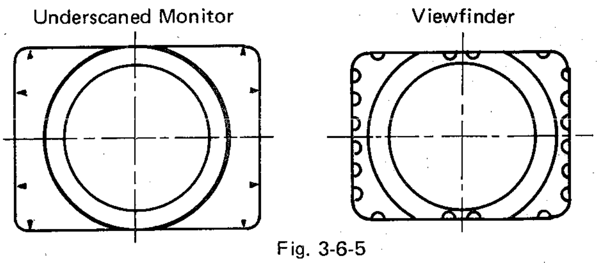


Fig. 3-6-5

e) Focus adjustment

Adjust: VR502 (FOCUS)

- Aim the camera at the resolution chart.
- Set the iris to F 4.0.
- Adjust VR502 (FOCUS) for best resolution in the viewfinder.

f) Picture tilt adjustment

- Make sure the camera head is level with the chart.
- Loosen the deflection coil holding screw.(Fig.3-6-3)
- Observe the viewfinder, and turn the deflection coil until the image is straight.
- Fasten the deflection coil.

g) Contrast and brightness adjustment

Adjusts: VR503 (BRIGHT)
VR505 (CONTRAST)

- Aim the camera at the logarithmic gray scale chart.
- While changing the iris from the closed position to F2, adjust VR503 (BRIGHT) and VR505 (CONTRAST) so that B/W chip gradations will be the same on the viewfinder screen as that in the monitor.

Steps denoted by shaded outlines do not have to be performed if only vidicon is replaced.

i) Indicator lamp check

- Check that all light intensity indicator LEDs work (in the viewfinder) when the iris is varied through its entire range. (Fig. 3-6-6)

j) Tally LED check

- Check the tally LED operation using the remote control switch. (Fig. 3-6-6)

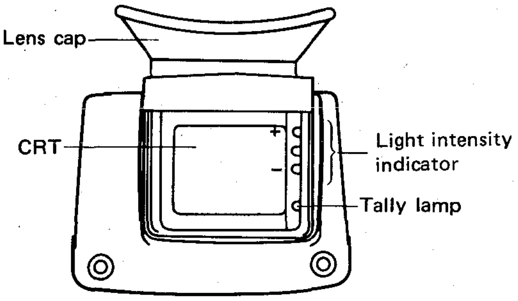

Lens cap
CRT
Light intensity indicator
Tally lamp
+
–

Fig. 3-6-6

VIDICON REPLACEMENT

- Disassemble the camera head while referring to "2-1 Camera Head Disassembly" on page 1.
- Remove the lens.
- Remove the front cover. (one screw) (Fig. 4-1)

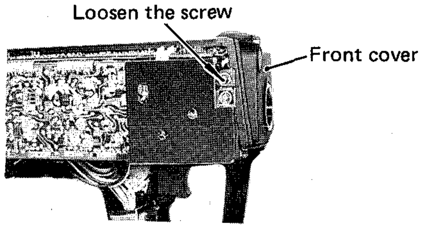

Loosen the screw
Front cover

Fig. 4-1

- Remove the lens mount. (three screws) (Fig. 4-2)
  Note the position of the cutout, pointing toward the handle.

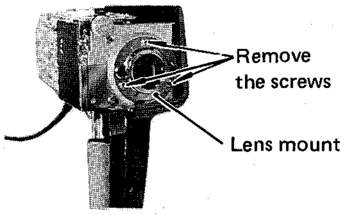

Remove the screws
Lens mount

Fig. 4-2

- Remove the vidicon socket. (See Fig. 4-4)
- After loosening the vidicon holding screw on the coil assembly (Fig. 4-3), push the vidicon out (in the direction of the lens). (Fig. 4-4)

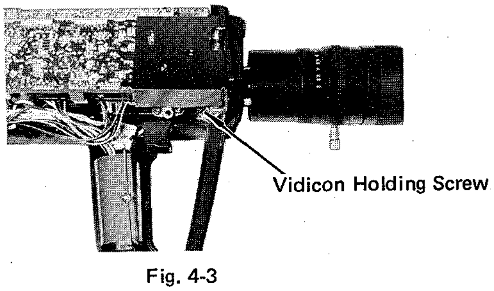

Vidicon Holding Screw

Fig. 4-3

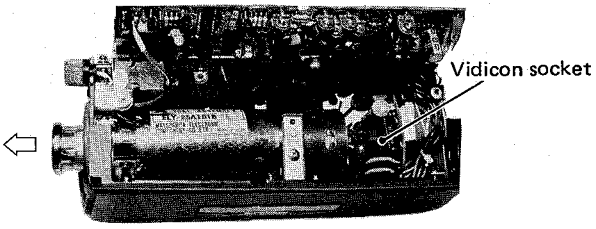

Vidicon socket

Fig. 4-4

- Install the new vidicon in the reverse order. Seat the socket before pushing the tube back in. Be sure to push the new vidicon completely until it stop.

<Note>

- **Store the vidicon in a dark place. When inserting it into place, be careful not to expose the target to external light.**
- Make sure that the vidicon is in the correct direction, i. e., the optical black is on the right as viewed from the front. The optical black must be at right angles to the mounting base. (Fig. 4-5)

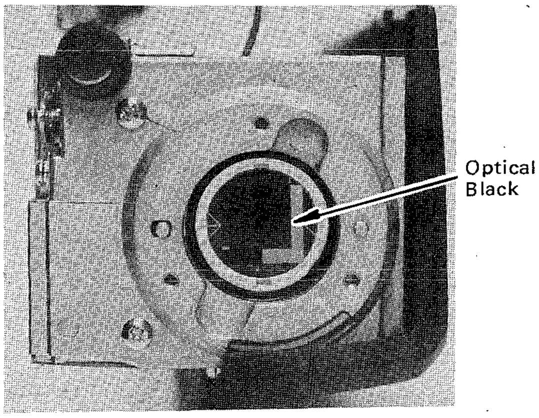

Optical Black

Fig. 4-5

- Clean the lens and vidicon face plate with the lens cleaning tissue. (Fig. 4-6)

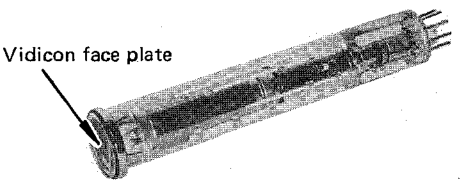
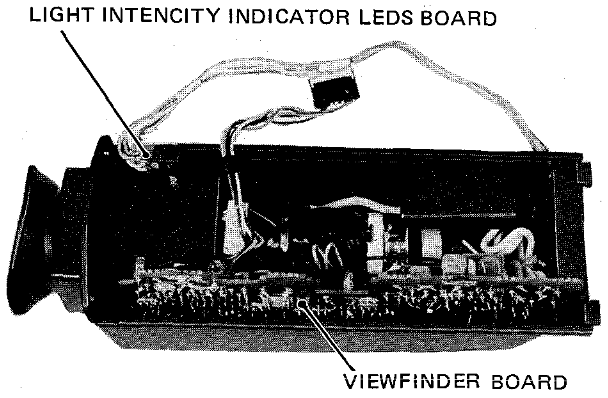

Vidicon face plate

Fig. 4-6

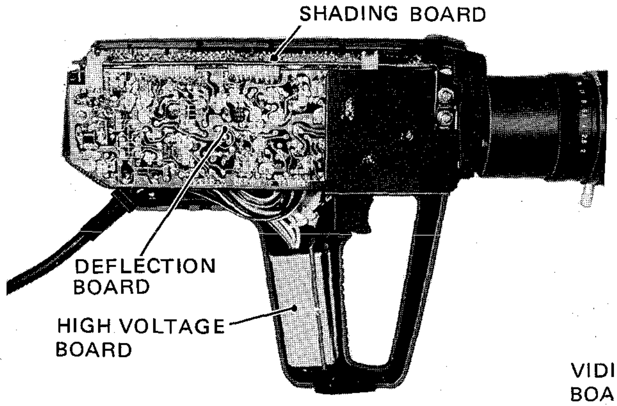
- Keep the holding screw fairly loose since it will have to be rotated slightly during alignment.
- Install the lens mount, front cover and lens.
- After replacing the vidicon, adjust the camera head and CCU according to "Adjustment Procedure" on page 3.

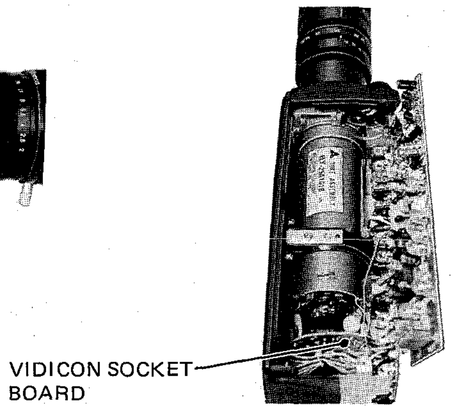
LOCATION OF CIRCUIT BOARD

- **Viewfinder**

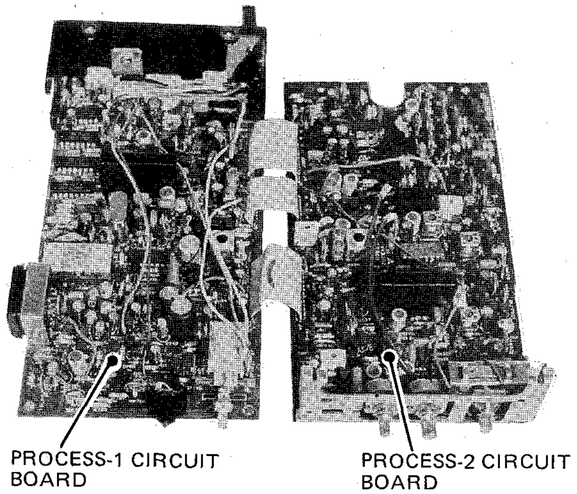

LIGHT INTENCITY INDICATOR LEDS BOARD
VIEWFINDER BOARD

- **Camera head**

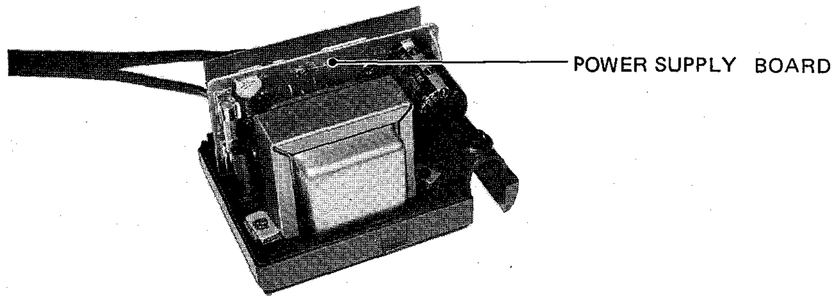

SHADING BOARD
DEFLECTION BOARD
HIGH VOLTAGE BOARD


VIDICON SOCKET BOARD

- **CCU**


PROCESS-1 CIRCUIT BOARD
PROCESS-2 CIRCUIT BOARD

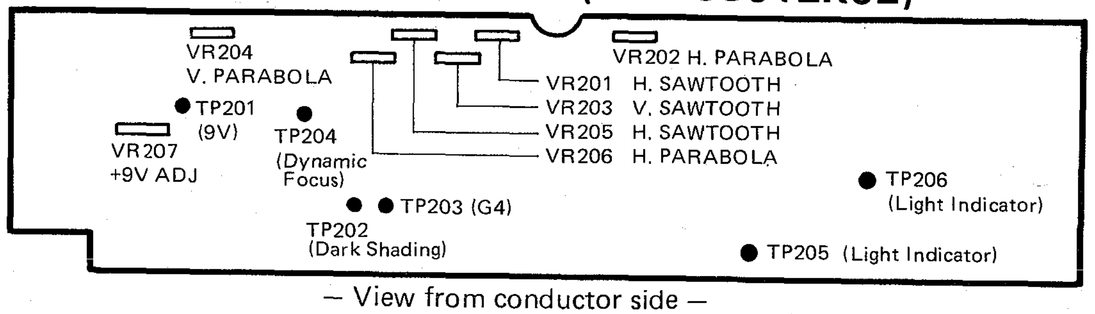
- **AC adaptor**


POWER SUPPLY BOARD

LOCATION OF ADJUSTMENT CONTROLS AND TEST POINTS.

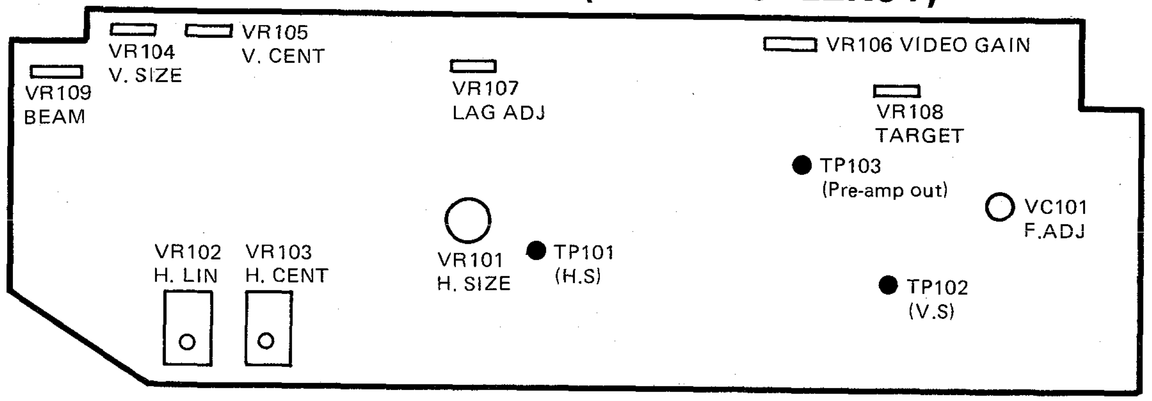
CAMERA HEAD

Shading Circuit Board (YWV3301ZK02)


VR204
V. PARABOLA
VR202 H. PARABOLA
VR201 H. SAWTOOTH
VR203 V. SAWTOOTH
VR205 H. SAWTOOTH
VR206 H. PARABOLA
TP201 (9V)
TP204 (Dynamic Focus)
VR207 +9V ADJ
TP203 (G4)
TP202 (Dark Shading)
TP206 (Light Indicator)
TP205 (Light Indicator)

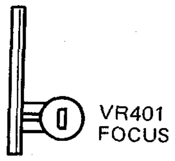
— View from conductor side —

Deflection Circuit Board (YWV3301EZK01)


VR104 V. SIZE
VR105 V. CENT
VR109 BEAM
VR107 LAG ADJ
VR106 VIDEO GAIN
VR108 TARGET
TP103 (Pre-amp out)
VC101 F.ADJ
VR102 H. LIN
VR103 H. CENT
VR101 H. SIZE
TP101 (H.S)
TP102 (V.S)

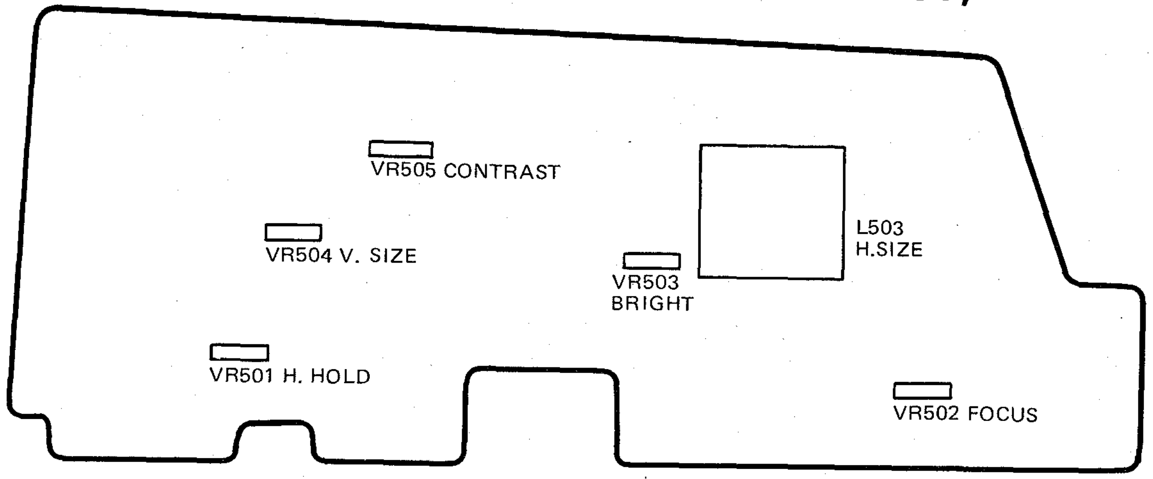
— View from conductor side —

Vidicon Socket Board (YWV3301ZK04)


VR401 FOCUS

VIEWFINDER

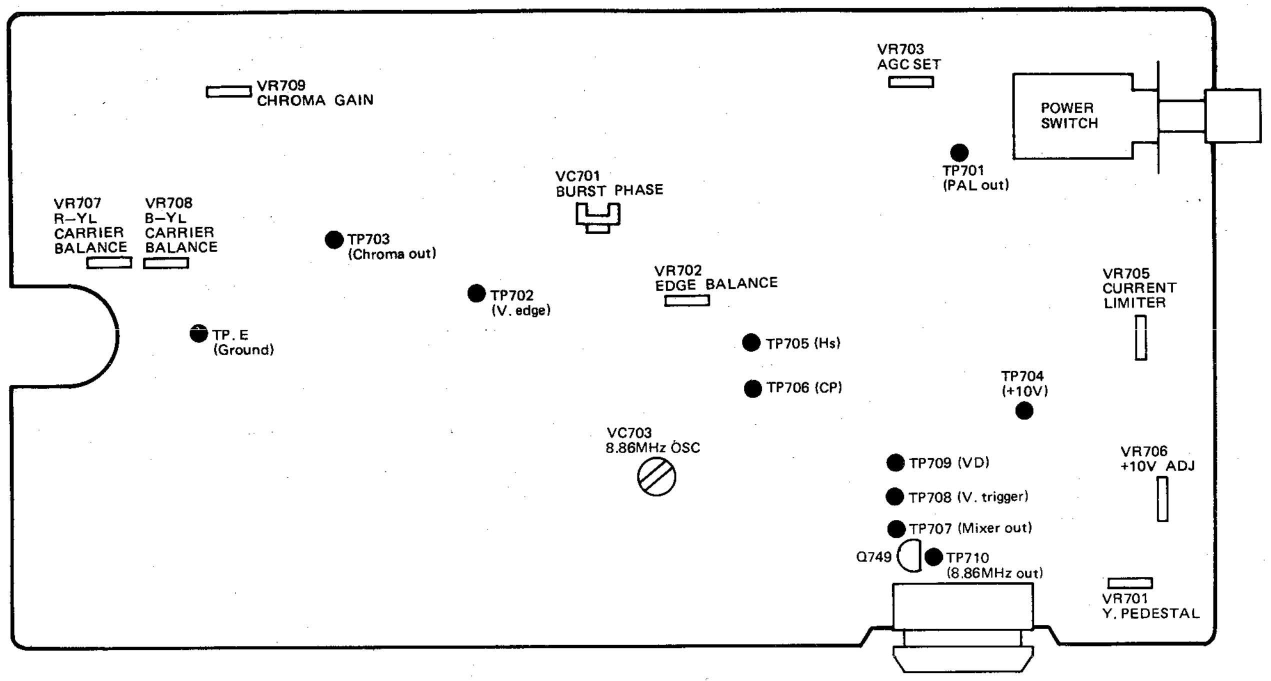
Viewfinder Circuit Board (YWV3304EZK05)


VR505 CONTRAST
VR504 V. SIZE
VR503 BRIGHT
L503 H.SIZE
VR501 H. HOLD
VR502 FOCUS

— View from component side —

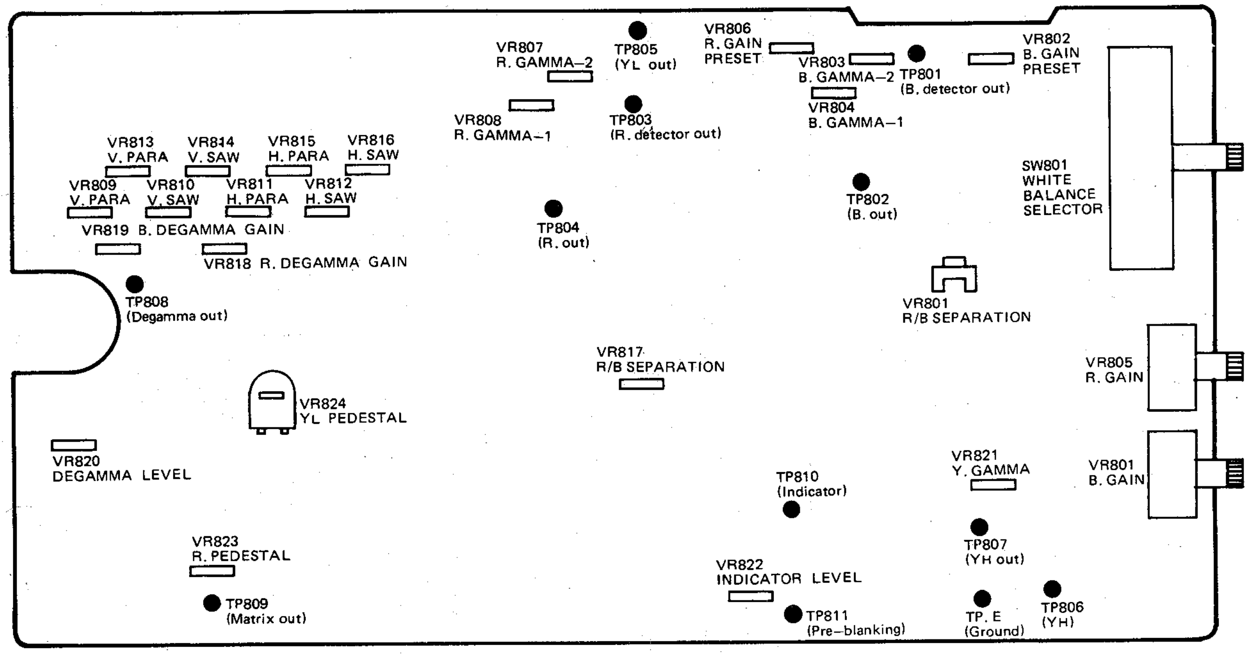
CCU

Process-1 Circuit Board (YWV3302EZK07)


VR709
CHROMA GAIN
VR703
AGC SET
POWER
SWITCH
TP701
(PAL out)
VC701
BURST PHASE
VR707
R–YL
CARRIER
BALANCE
VR708
B–YL
CARRIER
BALANCE
TP703
(Chroma out)
TP702
(V. edge)
VR702
EDGE BALANCE
VR705
CURRENT
LIMITER
TP. E
(Ground)
TP705 (Hs)
TP706 (CP)
TP704
(+10V)
VC703
8.86MHz OSC
TP709 (VD)
VR706
+10V ADJ
TP708 (V. trigger)
TP707 (Mixer out)
Q749
TP710
(8.86MHz out)
VR701
Y. PEDESTAL

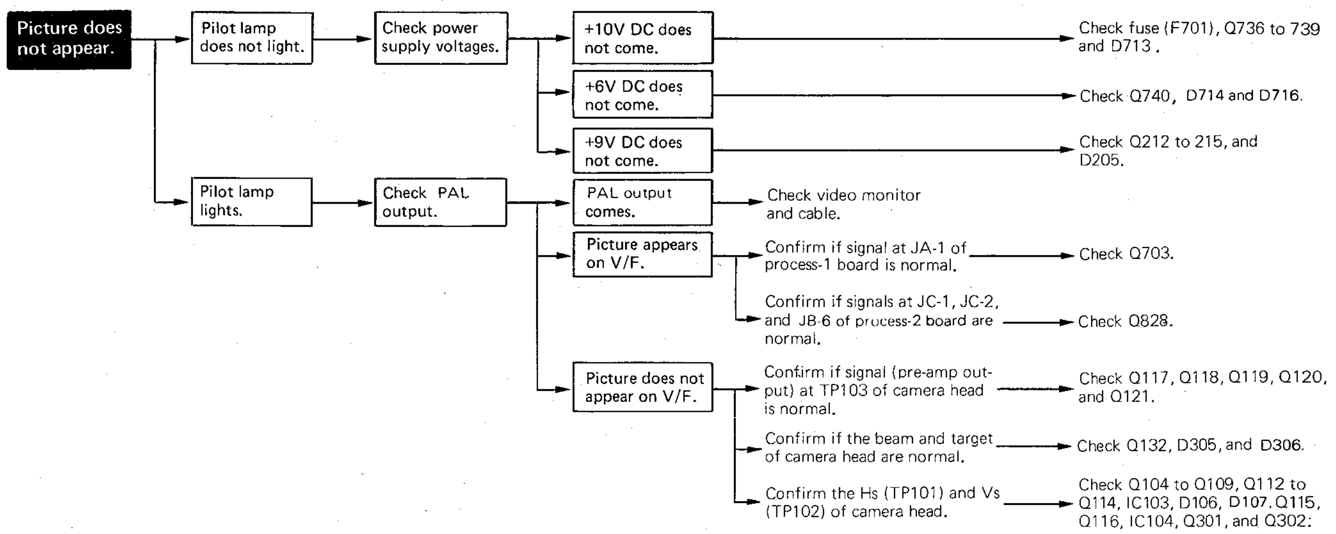
— View from component side —

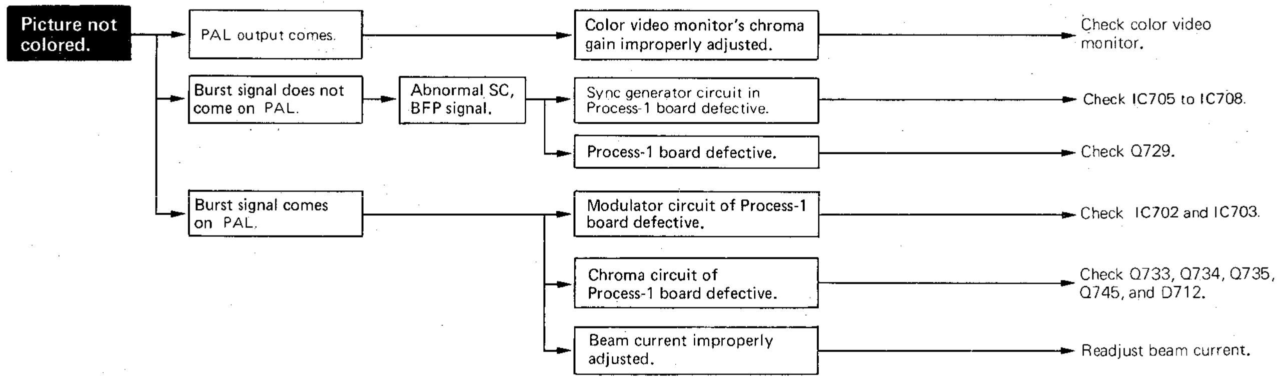
Process-2 Circuit Board (YWV3302EZK08)

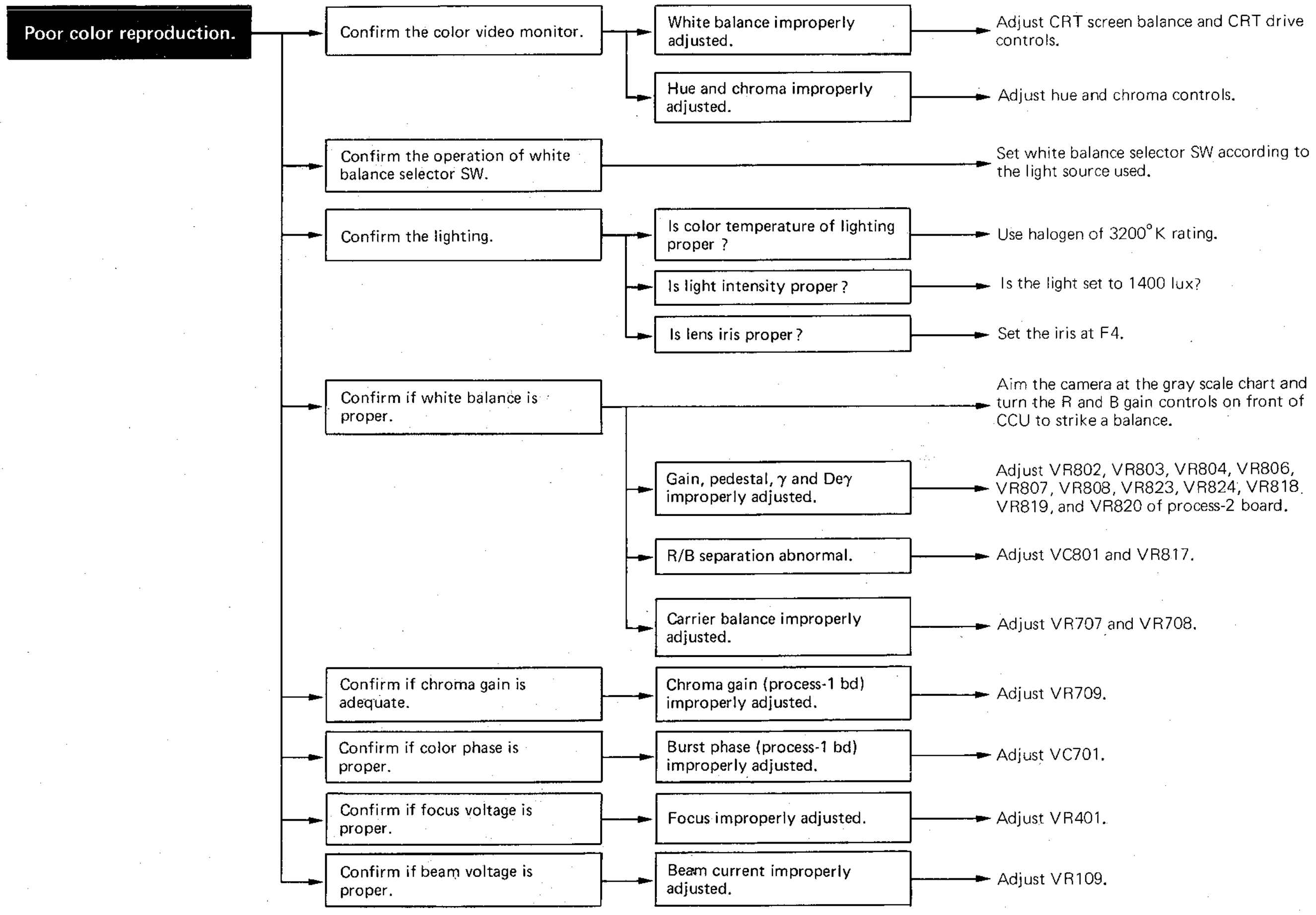

VR807
R. GAMMA–2
TP805
(YL out)
VR806
R. GAIN
PRESET
VR803
B. GAMMA–2
TP801
(B. detector out)
VR802
B. GAIN
PRESET
VR808
R. GAMMA–1
TP803
(R. detector out)
VR804
B. GAMMA–1
VR813
V. PARA
VR814
V. SAW
VR815
H. PARA
VR816
H. SAW
VR809
V. PARA
VR810
V. SAW
VR811
H. PARA
VR812
H. SAW
VR819 B. DEGAMMA GAIN
VR818 R. DEGAMMA GAIN
TP804
(R. out)
TP802
(B. out)
SW801
WHITE
BALANCE
SELECTOR
TP808
(Degamma out)
VR801
R/B SEPARATION
VR817
R/B SEPARATION
VR805
R. GAIN
VR824
YL PEDESTAL
VR820
DEGAMMA LEVEL
TP810
(Indicator)
VR821
Y. GAMMA
VR801
B. GAIN
VR823
R. PEDESTAL
TP807
(YH out)
VR822
INDICATOR LEVEL
TP809
(Matrix out)
TP811
(Pre–blanking)
TP. E
(Ground)
TP806
(YH)

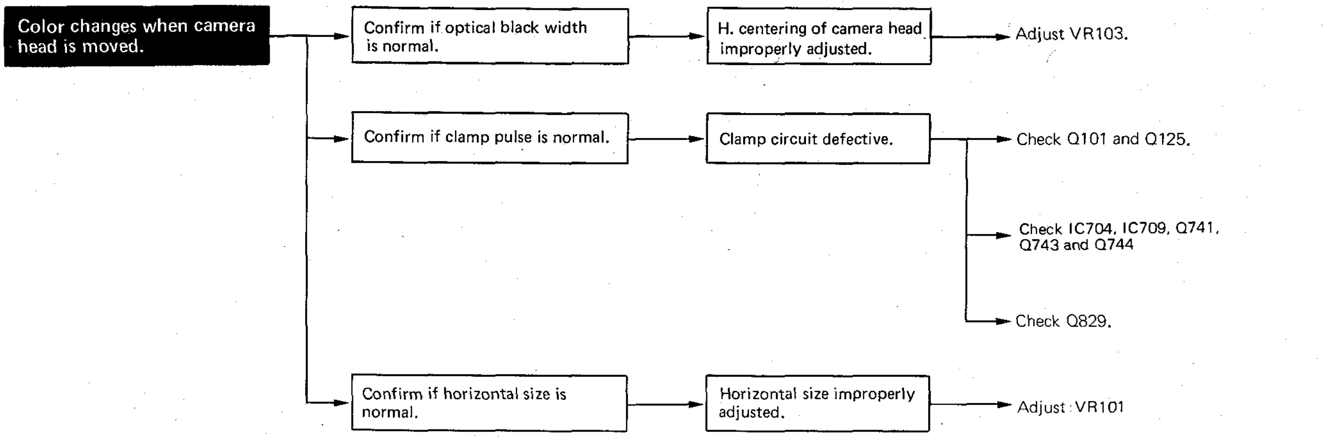
—View from component side —

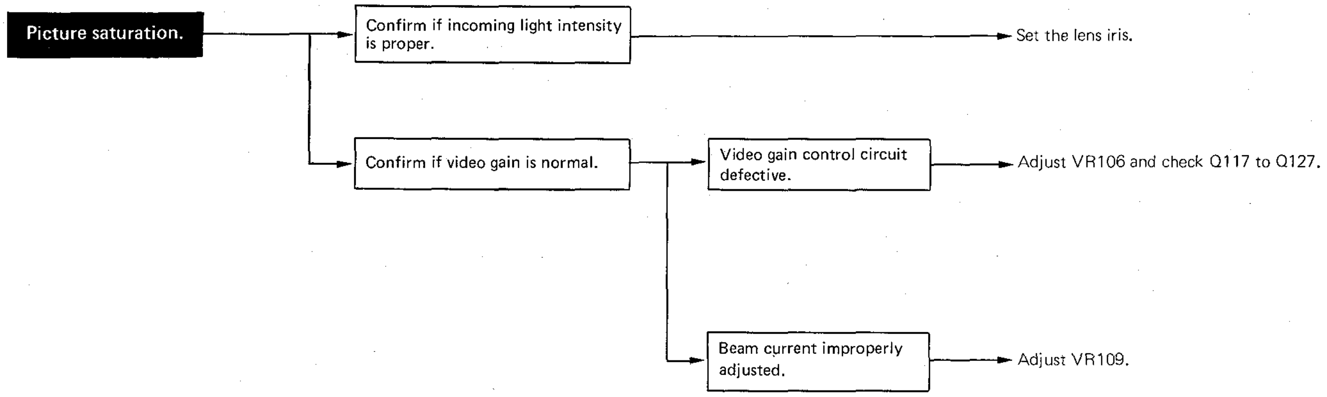
TROUBLE SHOOTING GUIDE

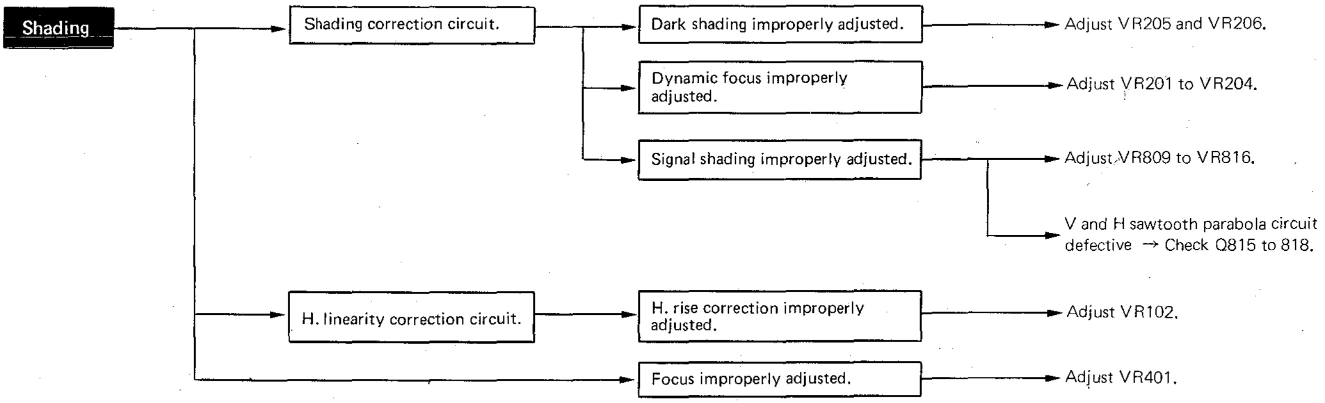

Picture does not appear.
Pilot lamp does not light.
Check power supply voltages.
+10V DC does not come.
Check fuse (F701), Q736 to 739 and D713 .
+6V DC does not come.
Check Q740, D714 and D716.
+9V DC does not come.
Check Q212 to 215, and D205.
Pilot lamp lights.
Check PAL output.
PAL output comes.
Check video monitor and cable.
Picture appears on V/F.
Confirm if signal at JA-1 of process-1 board is normal.
Check Q703.
Confirm if signals at JC-1, JC-2, and JB-6 of process-2 board are normal.
Check Q828.
Picture does not appear on V/F.
Confirm if signal (pre-amp output) at TP103 of camera head is normal.
Check Q117, Q118, Q119, Q120, and Q121.
Confirm if the beam and target of camera head are normal.
Check Q132, D305, and D306.
Confirm the Hs (TP101) and Vs (TP102) of camera head.
Check Q104 to Q109, Q112 to Q114, IC103, D106, D107.Q115, Q116, IC104, Q301, and Q302:

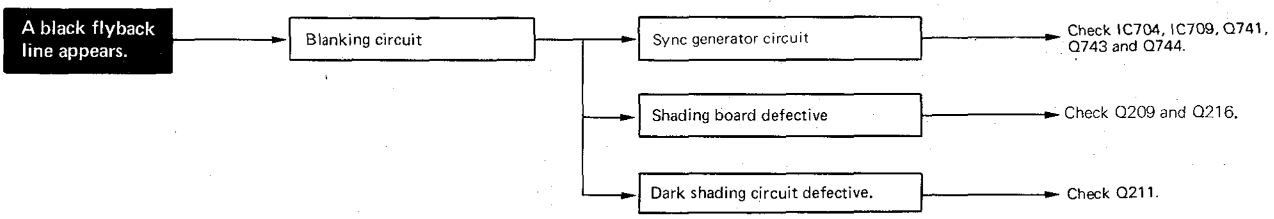

Picture not colored.
PAL output comes.
Color video monitor's chroma gain improperly adjusted.
Check color video monitor.
Burst signal does not come on PAL.
Abnormal SC, BFP signal.
Sync generator circuit in Process-1 board defective.
Check IC705 to IC708.
Process-1 board defective.
Check Q729.
Burst signal comes on PAL.
Modulator circuit of Process-1 board defective.
Check IC702 and IC703.
Chroma circuit of Process-1 board defective.
Check Q733, Q734, Q735, Q745, and D712.
Beam current improperly adjusted.
Readjust beam current.


Poor color reproduction.
Confirm the color video monitor.
White balance improperly adjusted.
Adjust CRT screen balance and CRT drive controls.
Hue and chroma improperly adjusted.
Adjust hue and chroma controls.
Confirm the operation of white balance selector SW.
Set white balance selector SW according to the light source used.
Confirm the lighting.
Is color temperature of lighting proper ?
Use halogen of 3200° K rating.
Is light intensity proper ?
Is the light set to 1400 lux?
Is lens iris proper ?
Set the iris at F4.
Confirm if white balance is proper.
Aim the camera at the gray scale chart and turn the R and B gain controls on front of CCU to strike a balance.
Gain, pedestal, γ and Deγ improperly adjusted.
Adjust VR802, VR803, VR804, VR806, VR807, VR808, VR823, VR824, VR818, VR819, and VR820 of process-2 board.
R/B separation abnormal.
Adjust VC801 and VR817.
Carrier balance improperly adjusted.
Adjust VR707 and VR708.
Confirm if chroma gain is adequate.
Chroma gain (process-1 bd) improperly adjusted.
Adjust VR709.
Confirm if color phase is proper.
Burst phase (process-1 bd) improperly adjusted.
Adjust VC701.
Confirm if focus voltage is proper.
Focus improperly adjusted.
Adjust VR401.
Confirm if beam voltage is proper.
Beam current improperly adjusted.
Adjust VR109.


Color changes when camera head is moved.
Confirm if optical black width is normal.
H. centering of camera head improperly adjusted.
Adjust VR103.
Confirm if clamp pulse is normal.
Clamp circuit defective.
Check Q101 and Q125.
Check IC704, IC709, Q741, Q743 and Q744
Check Q829.
Confirm if horizontal size is normal.
Horizontal size improperly adjusted.
Adjust VR101


Picture saturation.
Confirm if incoming light intensity is proper.
Set the lens iris.
Confirm if video gain is normal.
Video gain control circuit defective.
Adjust VR106 and check Q117 to Q127.
Beam current improperly adjusted.
Adjust VR109.


Shading
Shading correction circuit.
Dark shading improperly adjusted.
Adjust VR205 and VR206.
Dynamic focus improperly adjusted.
Adjust VR201 to VR204.
Signal shading improperly adjusted.
Adjust VR809 to VR816.
V and H sawtooth parabola circuit defective → Check Q815 to 818.
H. linearity correction circuit.
H. rise correction improperly adjusted.
Adjust VR102.
Focus improperly adjusted.
Adjust VR401.


A black flyback line appears.
Blanking circuit
Sync generator circuit
Check IC704, IC709, Q741, Q743 and Q744.
Shading board defective
Check Q209 and Q216.
Dark shading circuit defective.
Check Q211.

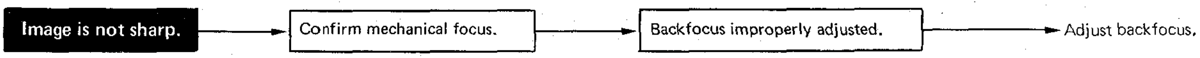
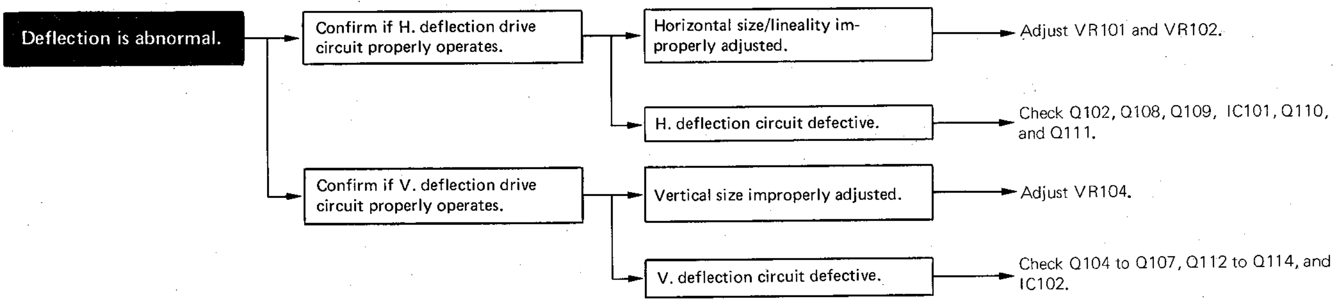
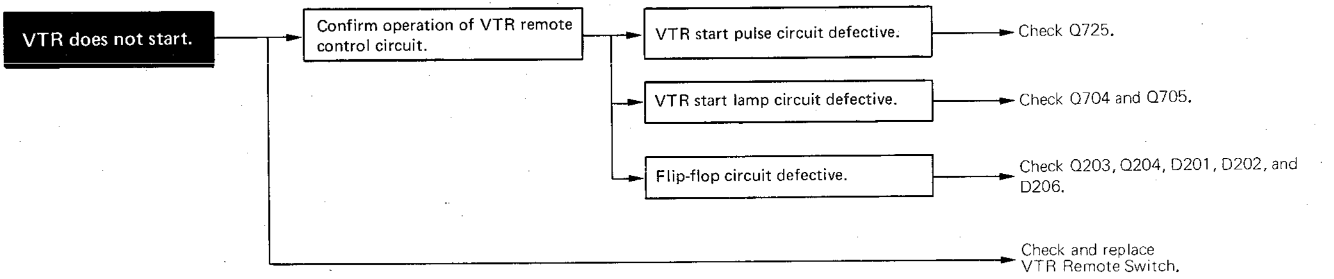
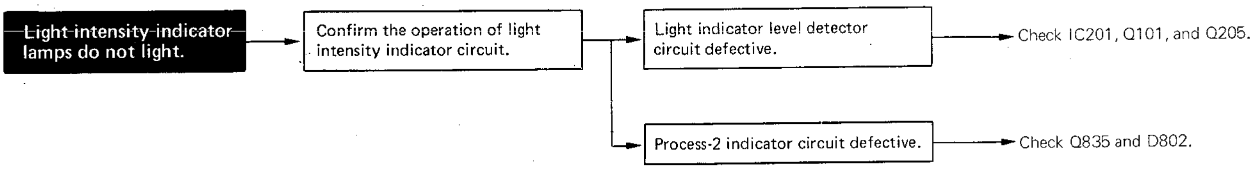


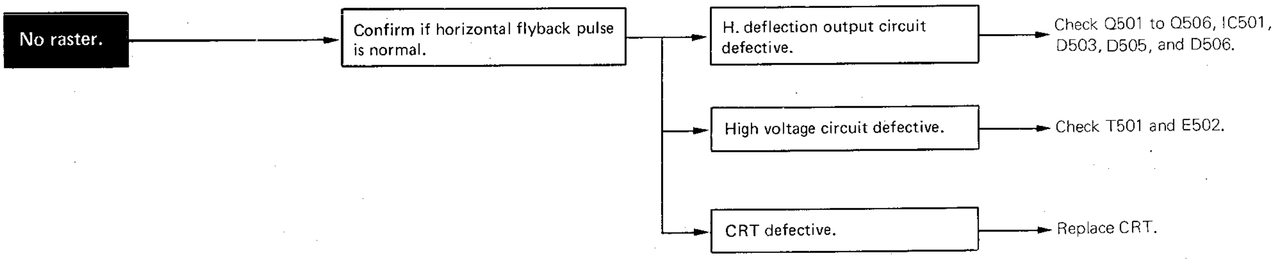
Image is not sharp.
Confirm mechanical focus.
Backfocus improperly adjusted.
Adjust backfocus.

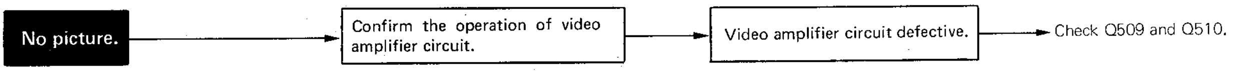

Deflection is abnormal.
Confirm if H. deflection drive circuit properly operates.
Horizontal size/lineality improperly adjusted.
Adjust VR101 and VR102.
H. deflection circuit defective.
Check Q102, Q108, Q109, IC101, Q110, and Q111.
Confirm if V. deflection drive circuit properly operates.
Vertical size improperly adjusted.
Adjust VR104.
V. deflection circuit defective.
Check Q104 to Q107, Q112 to Q114, and IC102.

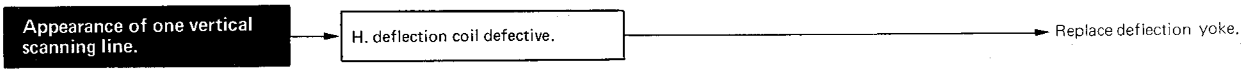

VTR does not start.
Confirm operation of VTR remote control circuit.
VTR start pulse circuit defective.
Check Q725.
VTR start lamp circuit defective.
Check Q704 and Q705.
Flip-flop circuit defective.
Check Q203, Q204, D201, D202, and D206.
Check and replace VTR Remote Switch.

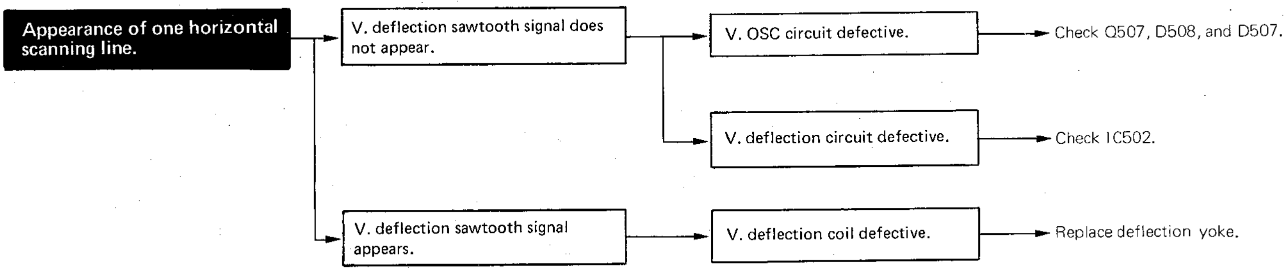

Light intensity indicator lamps do not light.
Confirm the operation of light intensity indicator circuit.
Light indicator level detector circuit defective.
Check IC201, Q101, and Q205.
Process-2 indicator circuit defective.
Check Q835 and D802.

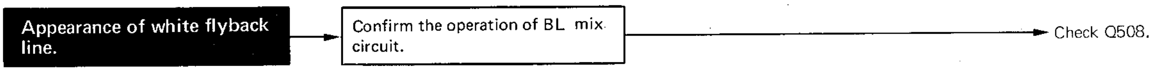
Viewfinder


No raster.
Confirm if horizontal flyback pulse is normal.
H. deflection output circuit defective.
Check Q501 to Q506, IC501, D503, D505, and D506.
High voltage circuit defective.
Check T501 and E502.
CRT defective.
Replace CRT.


No picture.
Confirm the operation of video amplifier circuit.
Video amplifier circuit defective.
Check Q509 and Q510.


Appearance of one vertical scanning line.
H. deflection coil defective.
Replace deflection yoke.


Appearance of one horizontal scanning line.
V. deflection sawtooth signal does not appear.
V. OSC circuit defective.
Check Q507, D508, and D507.
V. deflection circuit defective.
Check IC502.
V. deflection sawtooth signal appears.
V. deflection coil defective.
Replace deflection yoke.


Appearance of white flyback line.
Confirm the operation of BL mix circuit.
Check Q508.

Service Manual

Vol. 3

Block Diagrams
Schematic Diagrams
Conductor Views
Exploded Views

PAL COLOUR TV CAMERAS
WV-3300E/3310E

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Process-2 Circuit Board (YWV3302EZK08) 4

SCHEMATIC DIAGRAM

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EXPLODED VIEW

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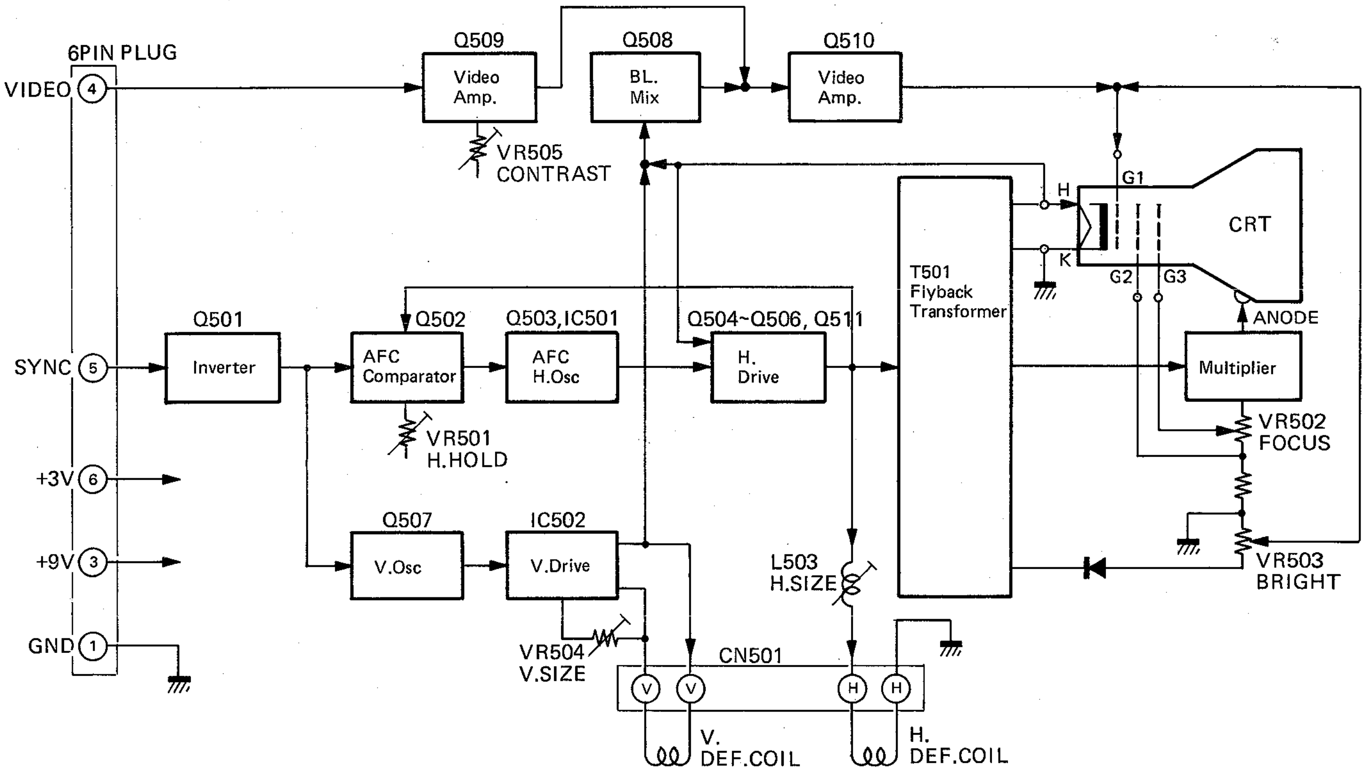
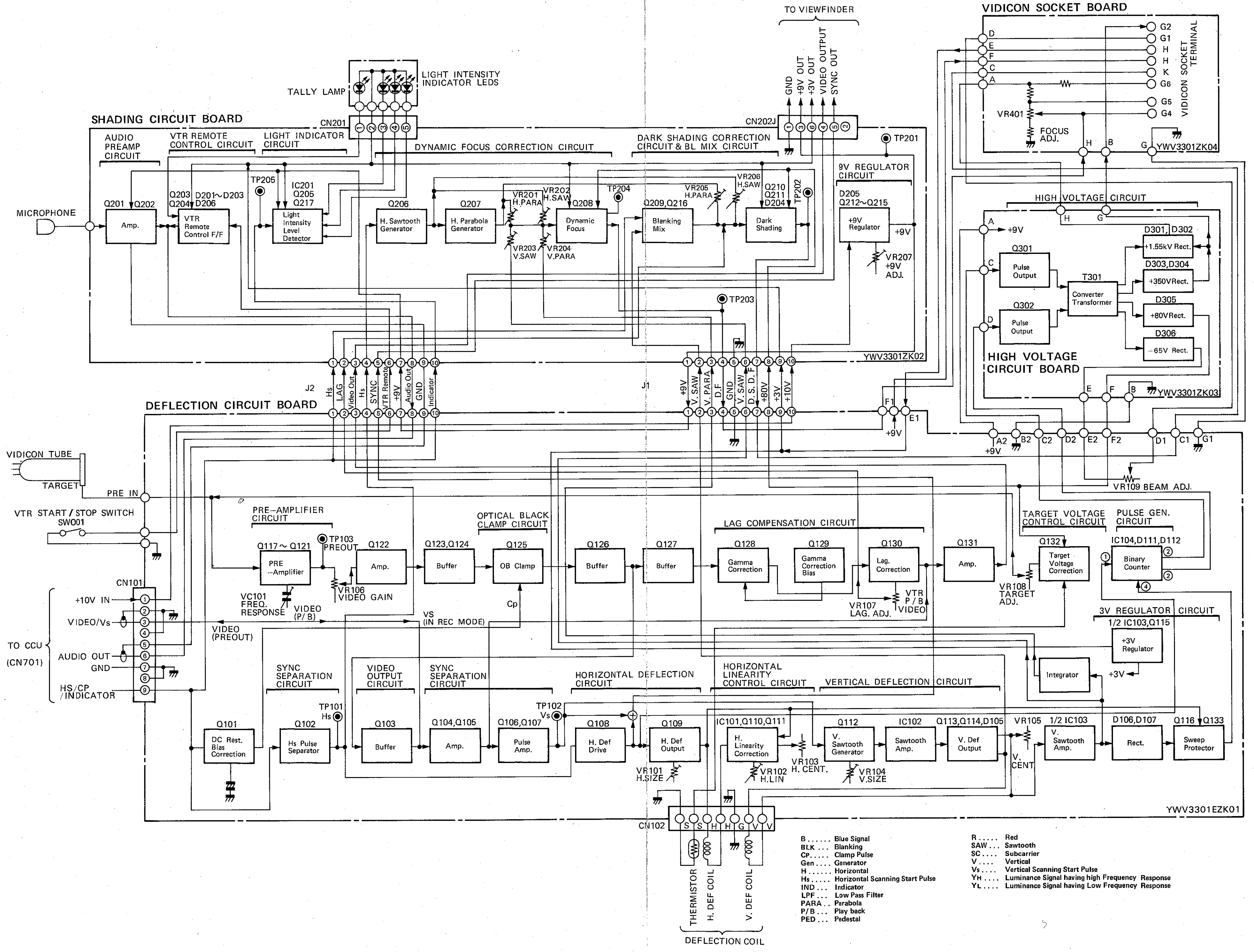
WV-3304E Electronic Viewfinder 14
WV-3314 Optical Viewfinder 15
WV-3302E Camera Control Unit and WV-3300E/3310E Accessory Parts 16
WV-3303E AC Adaptor and Packaging 17

BLOCK DIAGRAM OF YWV3304EZK05 (VIEWFINDER CIRCUIT BOARD)

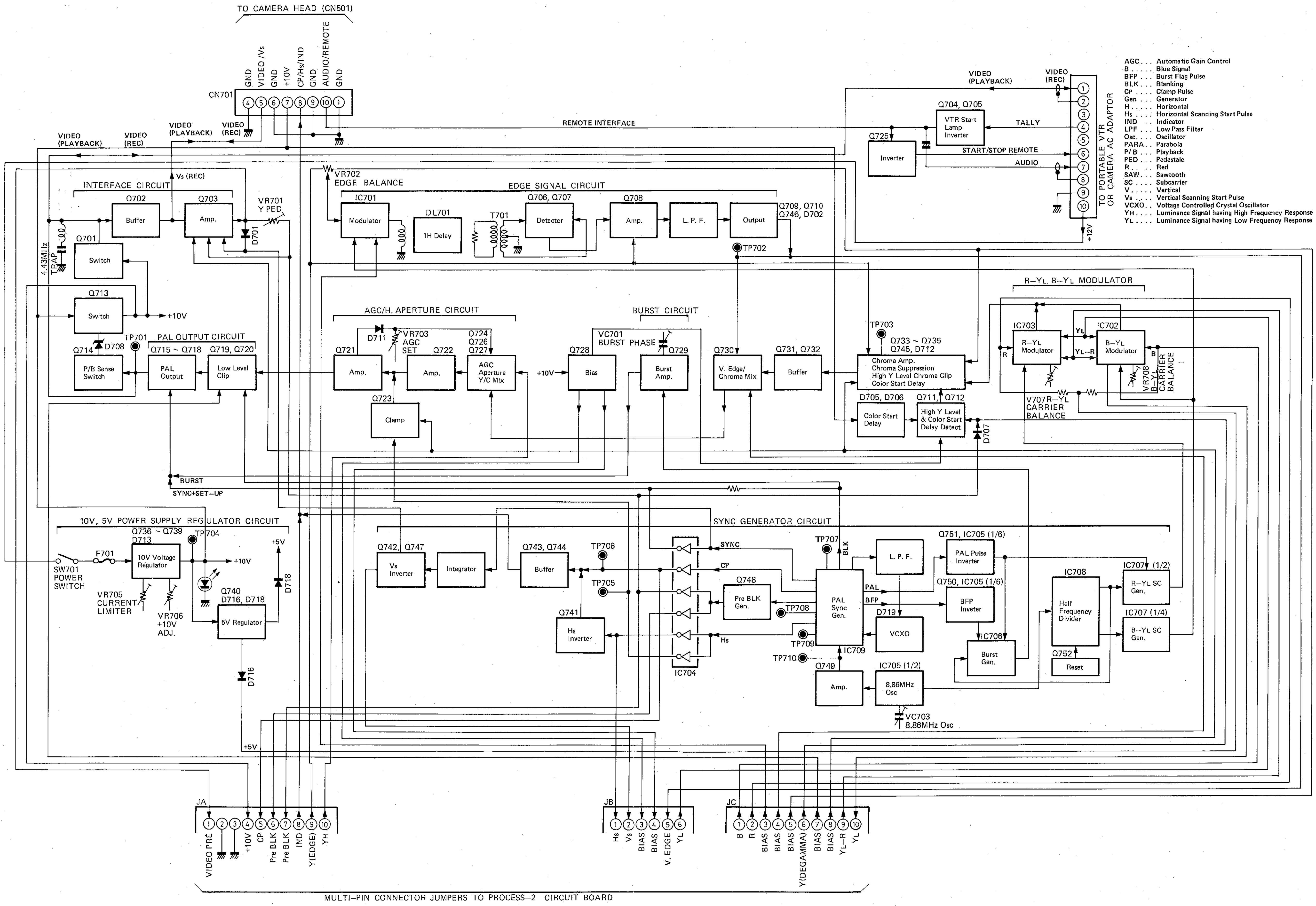

6PIN PLUG
VIDEO
4
SYNC
5
+3V
6
+9V
3
GND
1
Q509
Video Amp.
VR505
CONTRAST
Q508
BL. Mix
Q510
Video Amp.
Q501
Inverter
Q502
AFC Comparator
VR501
H.HOLD
Q503,IC501
AFC H.Osc
Q504~Q506, Q511
H. Drive
T501 Flyback Transformer
H
K
G1
G2
G3
CRT
ANODE
Multiplier
VR502
FOCUS
VR503
BRIGHT
Q507
V.Osc
IC502
V.Drive
VR504
V.SIZE
L503
H.SIZE
CN501
V
V
H
H
V. DEF.COIL
H. DEF.COIL

BLOCK DIAGRAM OF CAMERA HEAD (YWV3301EZK01, ZK02, ZK03, ZK04)


TO VIEWFINDER
GND
+9V OUT
+3V OUT
VIDEO OUTPUT
SYNC OUT
CN202J
VIDICON SOCKET BOARD
G2
G1
H
H
K
G6
G5
G4
VIDICON SOCKET TERMINAL
VR401
FOCUS ADJ.
YWV3301ZK04
TALLY LAMP
LIGHT INTENSITY INDICATOR LEDS
SHADING CIRCUIT BOARD
CN201
AUDIO PREAMP CIRCUIT
VTR REMOTE CONTROL CIRCUIT
LIGHT INDICATOR CIRCUIT
DYNAMIC FOCUS CORRECTION CIRCUIT
DARK SHADING CORRECTION CIRCUIT & BL MIX CIRCUIT
TP201
9V REGULATOR CIRCUIT
D205 Q212~Q215
+9V Regulator
+9V
VR207 +9V ADJ.
MICROPHONE
Q201
Q202
Amp.
Q203 Q204
D201~D203 D206
VTR Remote Control F/F
TP205
IC201 Q205 Q217
Light Intensity Level Detector
Q206
H. Sawtooth Generator
Q207
H. Parabola Generator
VR201 H.PARA
VR202 H.SAW
VR203 V.SAW
VR204 V.PARA
Q208
Dynamic Focus
TP204
Q209,Q216
Blanking Mix
VR205 H.PARA
VR206 H.SAW
Q210 Q211 D204
TP202
Dark Shading
TP203
HIGH VOLTAGE CIRCUIT
+9V
Q301
Pulse Output
Q302
Pulse Output
T301
Converter Transformer
D301, D302
+1.55kV Rect.
D303,D304
+350VRect.
D305
+80VRect.
D306
-65V Rect.
HIGH VOLTAGE CIRCUIT BOARD
YWV3301ZK03
YWV3301ZK02
J2
Hs
LAG
Video Out
Hs
SYNC
VTR Remote
+9V
Audio Out
GND
Indicator
J1
+9V
V. SAW
V. PARA
D.F
GND
V. SAW
D. S. D. F
+80V
+3V
+10V
DEFLECTION CIRCUIT BOARD
F1
E1
+9V
A2
B2
C2
D2
E2
F2
D1
C1
G1
VR109 BEAM ADJ.
VIDICON TUBE
TARGET
PRE IN
VTR START / STOP SWITCH SW001
PRE-AMPLIFIER CIRCUIT
Q117~Q121
PRE -Amplifier
TP103 PREOUT
Q122
Amp.
VR106 VIDEO GAIN
VC101 FREQ. RESPONSE
VIDEO (P/B)
Q123,Q124
Buffer
OPTICAL BLACK CLAMP CIRCUIT
Q125
OB Clamp
Cp
Q126
Buffer
Q127
Buffer
LAG COMPENSATION CIRCUIT
Q128
Gamma Correction
Q129
Gamma Correction Bias
Q130
Lag. Correction
VR107 LAG. ADJ.
VTR P/B VIDEO
Q131
Amp.
VR108 TARGET ADJ.
TARGET VOLTAGE CONTROL CIRCUIT
Q132
Target Voltage Correction
PULSE GEN. CIRCUIT
IC104,D111,D112
Binary Counter
3V REGULATOR CIRCUIT
1/2 IC103,Q115
+3V Regulator
+3V
Integrator
CN101
+10V IN
VIDEO/Vs
AUDIO OUT
GND
HS/CP /INDICATOR
TO CCU (CN701)
VIDEO (PREOUT)
VS (IN REC MODE)
SYNC SEPARATION CIRCUIT
VIDEO OUTPUT CIRCUIT
SYNC SEPARATION CIRCUIT
HORIZONTAL DEFLECTION CIRCUIT
HORIZONTAL LINEARITY CONTROL CIRCUIT
VERTICAL DEFLECTION CIRCUIT
Q101
DC Rest. Bias Correction
Q102
Hs Pulse Separator
TP101 Hs
Q103
Buffer
Q104,Q105
Amp.
Q106,Q107
Pulse Amp.
TP102 Vs
Q108
H. Def Drive
Q109
H. Def Output
VR101 H.SIZE
IC101,Q110,Q111
H. Linearity Correction
VR102 H.LIN
VR103 H. CENT.
Q112
V. Sawtooth Generator
VR104 V.SIZE
IC102
Sawtooth Amp.
Q113,Q114,D105
V. Def Output
V. CENT
VR105
1/2 IC103
V. Sawtooth Amp.
D106,D107
Rect.
Q116
Q133
Sweep Protector
YWV3301EZK01
CN102
S S H H G V V
THERMISTOR
H. DEF COIL
V. DEF COIL
DEFLECTION COIL

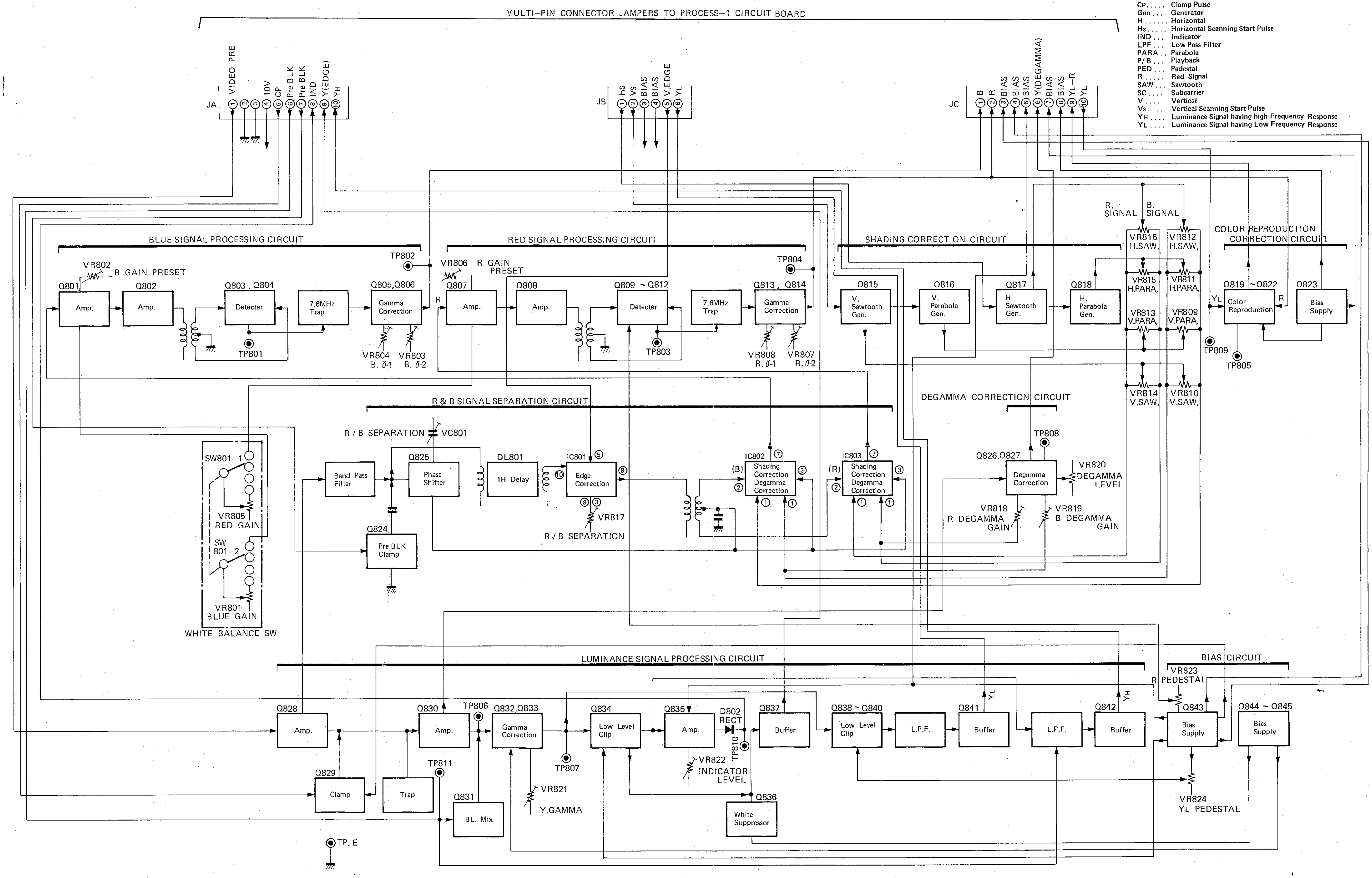
B	Blue Signal
BLK ...	Blanking
Cp.....	Clamp Pulse
Gen	Generator
H	Horizontal
Hs	Horizontal Scanning Start Pulse
IND ...	Indicator
LPF ...	Low Pass Filter
PARA ..	Parabola
P/B ...	Play back
PED ...	Pedestal
R	Red
SAW ...	Sawtooth
SC	Subcarrier
V	Vertical
Vs	Vertical Scanning Start Pulse
YH	Luminance Signal having high Frequency Response
YL	Luminance Signal having Low Frequency Response

BLOCK DIAGRAM OF YWV3302EZK07 (PROCESS-1 CIRCUIT BOARD IN CCU)


TO CAMERA HEAD (CN501)
CN701
GND
VIDEO /Vs
GND
+10V
CP/Hs/IND
GND
AUDIO/REMOTE
GND
④⑤⑥⑦⑧⑨⑩①
VIDEO (PLAYBACK)
VIDEO (REC)
REMOTE INTERFACE
Vs (REC)
INTERFACE CIRCUIT
Q702
Buffer
Q703
Amp.
VR701 Y PED
D701
Q701
Switch
4.43MHz TRAP
Q713
Switch
+10V
TP701
PAL OUTPUT CIRCUIT
Q714
D708
P/B Sense Switch
Q715 ~ Q718
PAL Output
Q719, Q720
Low Level Clip
BURST
SYNC+SET-UP
VR702
EDGE BALANCE
IC701
Modulator
DL701
1H Delay
T701
EDGE SIGNAL CIRCUIT
Q706, Q707
Detector
Q708
Amp.
L. P. F.
Output
Q709, Q710
Q746, D702
TP702
AGC/H. APERTURE CIRCUIT
D711
VR703
AGC SET
Q721
Amp.
Q722
Amp.
Q724
Q726
Q727
AGC Aperture Y/C Mix
Q723
Clamp
+10V
BURST CIRCUIT
VC701
BURST PHASE
Q728
Bias
Q729
Burst Amp.
Q730
V. Edge/ Chroma Mix
Q731, Q732
Buffer
TP703
Q733 ~ Q735
Q745, D712
Chroma Amp.
Chroma Suppression
High Y Level Chroma Clip
Color Start Delay
D705, D706
Color Start Delay
Q711, Q712
High Y Level & Color Start Delay Detect
D707
R–YL, B–YL MODULATOR
IC703
R–YL Modulator
IC702
B–YL Modulator
YL
YL–R
R
B
V707R–YL CARRIER BALANCE
VR708 B–YL CARRIER BALANCE
Q704, Q705
VTR Start Lamp Inverter
Q725
Inverter
TALLY
START/STOP REMOTE
AUDIO
VIDEO (PLAYBACK)
VIDEO (REC)
①②③④⑤⑥⑦⑧⑨⑩
TO PORTABLE VTR OR CAMERA AC ADAPTOR
+12V
10V, 5V POWER SUPPLY REGULATOR CIRCUIT
Q736 ~ Q739
D713
TP704
F701
SW701 POWER SWITCH
10V Voltage Regulator
+10V
+5V
VR705 CURRENT LIMITER
VR706 +10V ADJ.
Q740
D716, D718
5V Regulator
D718
D716
+5V
SYNC GENERATOR CIRCUIT
Q742, Q747
Vs Inverter
Integrator
Q743, Q744
Buffer
TP706
TP705
Q741
Hs Inverter
SYNC
CP
Hs
IC704
Q748
Pre BLK Gen.
TP708
TP707
BLK
PAL
BFP
PAL Sync Gen.
TP709
TP710
IC709
L. P. F.
D719
VCXO
Q751, IC705 (1/6)
PAL Pulse Inverter
Q750, IC705 (1/6)
BFP Inveter
IC706
Burst Gen.
Q749
Amp.
IC705 (1/2)
8.86MHz Osc
VC703
8.86MHz Osc
IC708
Half Frequency Divider
Q752
Reset
IC707 (1/2)
R–YL SC Gen.
IC707 (1/4)
B–YL SC Gen.
JA
①②③④⑤⑥⑦⑧⑨⑩
VIDEO PRE
+10V
CP
Pre BLK
Pre BLK
IND
Y(EDGE)
YH
JB
①②③④⑤⑥
Hs
Vs
BIAS
BIAS
V. EDGE
YL
JC
①②③④⑤⑥⑦⑧⑨⑩
B
R
BIAS
BIAS
BIAS
Y(DEGAMMA)
BIAS
BIAS
YL–R
YL
MULTI–PIN CONNECTOR JUMPERS TO PROCESS–2 CIRCUIT BOARD

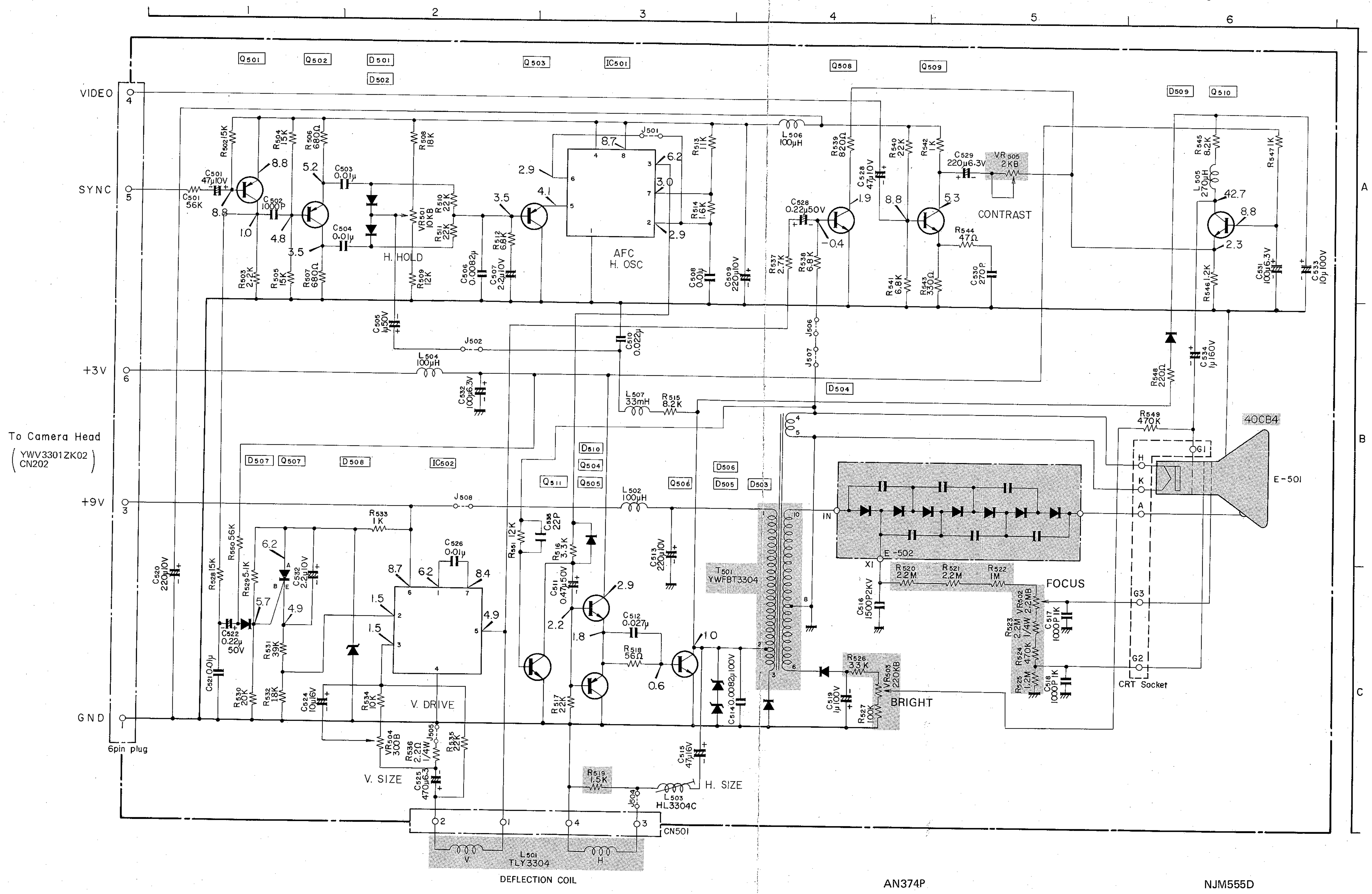
AGC . . .	Automatic Gain Control
B	Blue Signal
BFP . . .	Burst Flag Pulse
BLK . . .	Blanking
CP	Clamp Pulse
Gen . . .	Generator
H	Horizontal
Hs	Horizontal Scanning Start Pulse
IND . .	Indicator
LPF . . .	Low Pass Filter
Osc. . . .	Oscillator
PARA . .	Parabola
P/B . . .	Playback
PED . . .	Pedestale
R	Red
SAW . . .	Sawtooth
SC	Subcarrier
V	Vertical
Vs	Vertical Scanning Start Pulse
VCXO . .	Voltage Controlled Crystal Oscillator
YH	Luminance Signal having High Frequency Response
YL	Luminance Signal having Low Frequency Response

BLOCK DIAGRAM OF YWV3302EZK08 (PROCESS-2 CIRCUIT BOARD IN CCU)

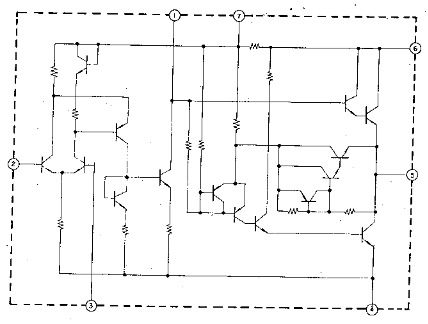

MULTI–PIN CONNECTOR JAMPERS TO PROCESS–1 CIRCUIT BOARD
JA
① VIDEO PRE
②
③
④ 10V
⑤ CP
⑥ Pre BLK
⑦ Pre BLK
⑧ IND
⑨ Y(EDGE)
⑩ YH
JB
① Hs
② Vs
③ BIAS
④ BIAS
⑤ V.EDGE
⑥ YL
JC
① B
② R
③ BIAS
④ BIAS
⑤ BIAS
⑥ Y(DEGAMMA)
⑦ BIAS
⑧ BIAS
⑨ YL–R
⑩ YL
BLUE SIGNAL PROCESSING CIRCUIT
VR802
B GAIN PRESET
Q801
Amp.
Q802
Amp.
Q803 , Q804
Detecter
TP801
7.6MHz Trap
TP802
Q805,Q806
Gamma Correction
VR804 B. γ-1
VR803 B. γ-2
RED SIGNAL PROCESSING CIRCUIT
VR806 R GAIN PRESET
R
Q807
Amp.
Q808
Amp.
Q809 ~ Q812
Detecter
TP803
7.6MHz Trap
TP804
Q813 , Q814
Gamma Correction
VR808 R. γ-1
VR807 R. γ-2
SHADING CORRECTION CIRCUIT
Q815
V. Sawtooth Gen.
Q816
V. Parabola Gen.
Q817
H. Sawtooth Gen.
Q818
H. Parabola Gen.
R. SIGNAL
B. SIGNAL
VR816 H.SAW,
VR812 H.SAW,
VR815 H.PARA,
VR811 H.PARA,
VR813 V.PARA,
VR809 V.PARA,
VR814 V.SAW,
VR810 V.SAW,
COLOR REPRODUCTION CORRECTION CIRCUIT
YL
Q819 ~Q822
Color Reproduction
R
Q823
Bias Supply
TP809
TP805
DEGAMMA CORRECTION CIRCUIT
TP808
Q826,Q827
Degamma Correction
VR820 DEGAMMA LEVEL
VR818 R DEGAMMA GAIN
VR819 B DEGAMMA GAIN
R & B SIGNAL SEPARATION CIRCUIT
R / B SEPARATION
VC801
Band Pass Filter
Q825
Phase Shifter
DL801
1H Delay
IC801 ⑤
⑩
Edge Correction
⑧
⑨ ③
VR817 R / B SEPARATION
Q824
Pre BLK Clamp
IC802 ⑦
(B)
Shading Correction Degamma Correction
② ③ ① ①
IC803 ⑦
(R)
Shading Correction Degamma Correction
② ③ ① ①
SW801–1
VR805 RED GAIN
SW 801–2
VR801 BLUE GAIN
WHITE BALANCE SW
LUMINANCE SIGNAL PROCESSING CIRCUIT
Q828
Amp.
Q829
Clamp
Trap
TP811
Q830
Amp.
TP806
Q831
BL. Mix
Q832,Q833
Gamma Correction
VR821 Y.GAMMA
TP807
Q834
Low Level Clip
Q835
Amp.
VR822 INDICATOR LEVEL
D802 RECT
TP810
Q836
White Suppressor
Q837
Buffer
Q838 ~ Q840
Low Level Clip
L.P.F.
Q841
Buffer
YL
L.P.F.
Q842
Buffer
YH
BIAS CIRCUIT
VR823 R PEDESTAL
Q843
Bias Supply
Q844 ~ Q845
Bias Supply
VR824 YL PEDESTAL
TP. E

B . . . . . . Blue Signal
BLK . . . Blanking
CP. . . . . Clamp Pulse
Gen . . . . Generator
H . . . . . . Horizontal
Hs . . . . . Horizontal Scanning Start Pulse
IND . . . Indicator
LPF . . . Low Pass Filter
PARA . . Parabola
P/ B . . . Playback
PED . . . Pedestal
R . . . . . Red Signal
SAW . . . Sawtooth
SC . . . . Subcarrier
V . . . . Vertical
Vs . . . . Vertical Scanning Start Pulse
YH . . . . Luminance Signal having high Frequency Response
YL . . . . Luminance Signal having Low Frequency Response

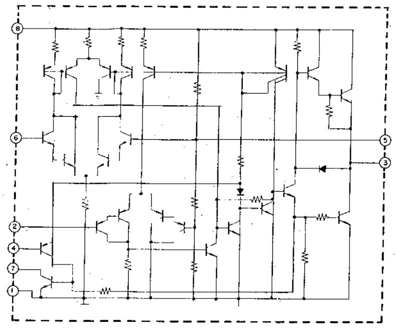
SCHEMATIC DIAGRAM OF YWV3304EZK05 (VIEWFINDER CIRCUIT BOARD)


1
2
3
4
5
6
A
B
C
VIDEO
SYNC
+3V
+9V
GND
To Camera Head
(YWV3301ZK02 CN202)
6pin plug
Q501
Q502
D501
D502
Q503
IC501
Q508
Q509
D509
Q510
H. HOLD
AFC H. OSC
CONTRAST
40CB4
E-501
CRT Socket
FOCUS
BRIGHT
V. DRIVE
V. SIZE
H. SIZE
T501 YWFBT3304
E-502
IN
D507
Q507
D508
IC502
D510
D504
Q511
Q505
Q506
D506
D505
D503
D504
J501
J502
J506
J507
J508
J505
J509
L506 100μH
L504 100μH
L507 33mH
L502 100μH
L505 270μH
L503 HL3304C
VR505 2KB
VR501 10KB
VR502 2.2MB
VR503 220KB
VR504 300B
CN501
L501 TLY3304
V
H
DEFLECTION COIL
H
K
A
G1
G2
G3
XI

AN374P



NJM555D



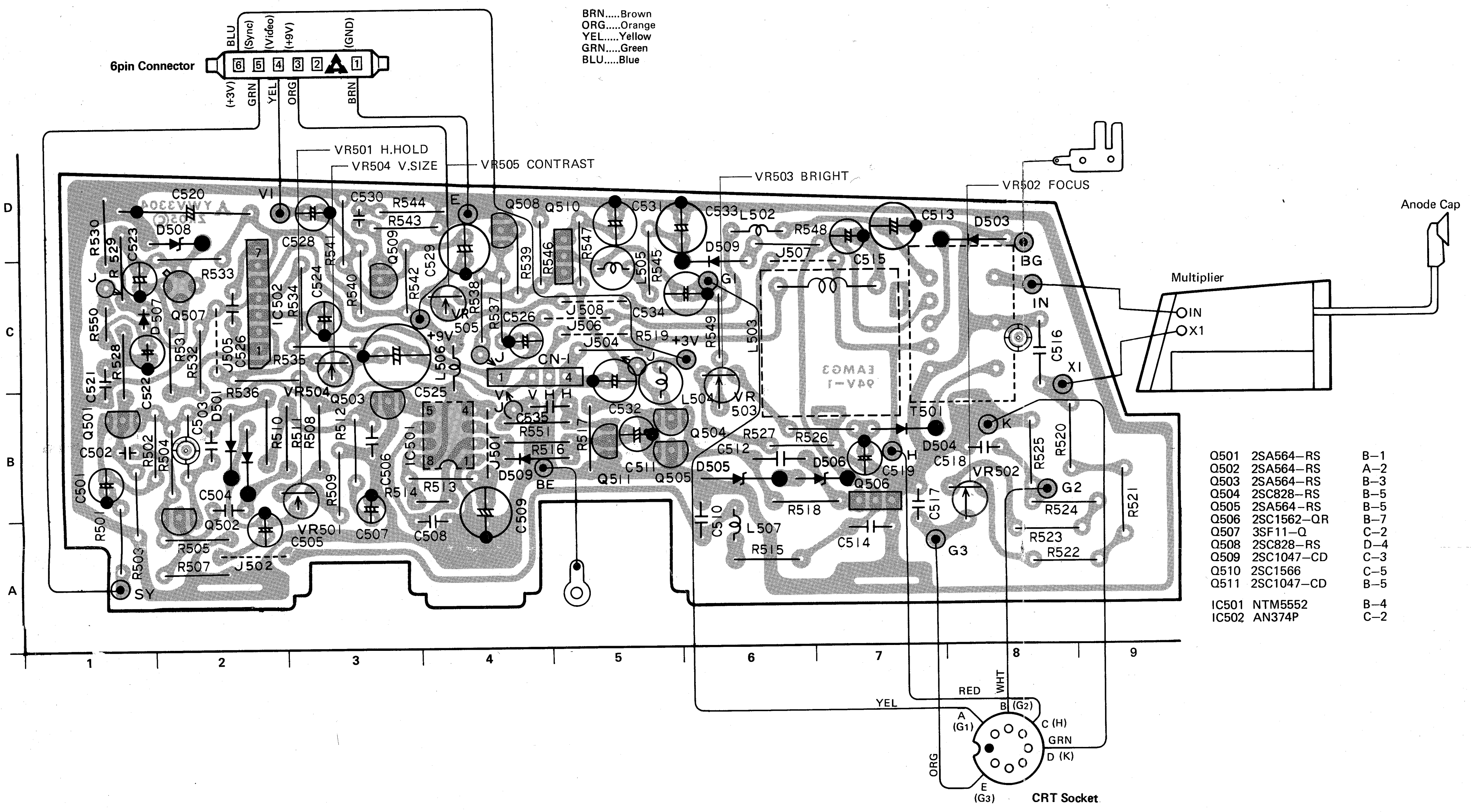
IC_{501}	YWNJM555D	A3
IC_{502}	AN374P	C2
Q_{501}	2SA564-RS	A1
Q_{502}	2SA564-RS	A1
Q_{503}	2SA564-RS	A2
Q_{504}	2SC828-RS	C3
Q_{505}	2SA564-RS	C3
Q_{506}	2SC1567-QR	C3
Q_{507}	3SF11-Q	C1
Q_{508}	2SC828-RS	A4
Q_{509}	2SC1047-CD	A5
Q_{510}	2SC1566	A6
Q_{511}	2SC1047CD	C2
D_{501}	MA150	A2
D_{502}	MA150	A2
D_{503}	YUDERB2404C	C4
D_{504}	YWRA-1Z	C4
D_{505}	YUDEQB01-50B	C3
D_{506}	XZ345	C3
D_{507}	MA150	C1
D_{508}	YUDXZ062	C2
D_{509}	YWRA-1Z	B6
D_{510}	MA150	B3
E_{502}	YWMPU3304	B5

PRODUCT SAFETY NOTE

The shaded area on this schematic incorporates special features important for protection from X-radiation, fire and electrical shock hazards.
When servicing, it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.

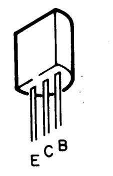
Notes:
1. Do not order components by Part No. written on schematic diagram or conductor view of P. C. B. Use replacement parts list.
2. DC voltages are measured with digital voltmeter to chassis.
3. Resistors are carbon and 1/8 watt except R523 and R536.

CONDUCTOR VIEW OF YWV3304EZK05 (VIEWFINDER CIRCUIT BOARD)
(Component Side)

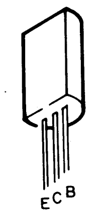

BRN.....Brown
ORG.....Orange
YEL.....Yellow
GRN.....Green
BLU.....Blue
6pin Connector
BLU
(Sync)
(Video)
(+9V)
(GND)
(+3V)
GRN
YEL
ORG
BRN
VR501 H.HOLD
VR504 V.SIZE
VR505 CONTRAST
VR503 BRIGHT
VR502 FOCUS
Anode Cap
Multiplier
IN
X1
BG
G1
G2
G3
K
H
SY
D
C
B
A
1
2
3
4
5
6
7
8
9
YEL
RED
WHT
ORG
GRN
A (G1)
B (G2)
C (H)
D (K)
E (G3)
CRT Socket

Q501	2SA564–RS	B–1
Q502	2SA564–RS	A–2
Q503	2SA564–RS	B–3
Q504	2SC828–RS	B–5
Q505	2SA564–RS	B–5
Q506	2SC1562–QR	B–7
Q507	3SF11–Q	C–2
Q508	2SC828–RS	D–4
Q509	2SC1047–CD	C–3
Q510	2SC1566	C–5
Q511	2SC1047–CD	B–5
IC501	NTM5552	B–4
IC502	AN374P	C–2

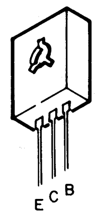
2SA564–RS
2SC828–RS



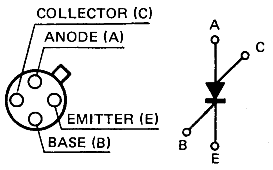
2SC1047–CD



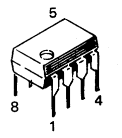
2SC1567–QR
2SC1566



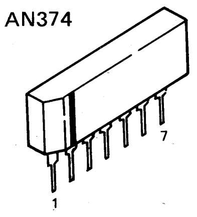
3SF11–Q


COLLECTOR (C)
ANODE (A)
EMITTER (E)
BASE (B)
A
C
B
E

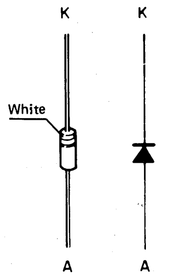
NJM555D



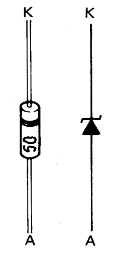
AN374



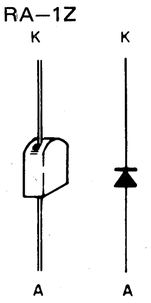
MA150
ERB24–04C



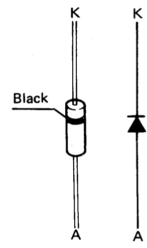
EQB01–50B



RA–1Z

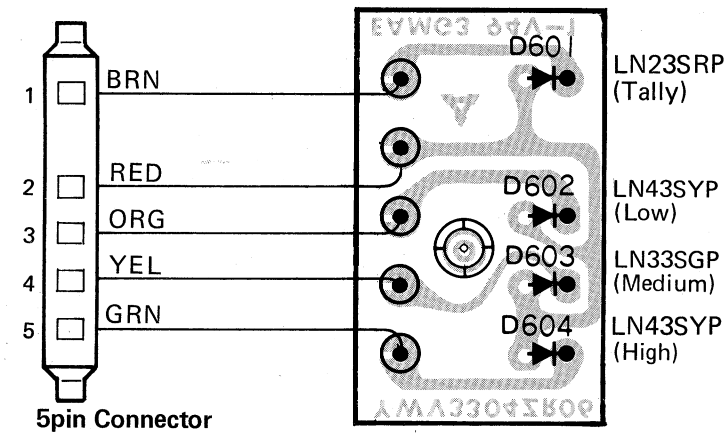


XZ345
XZ062

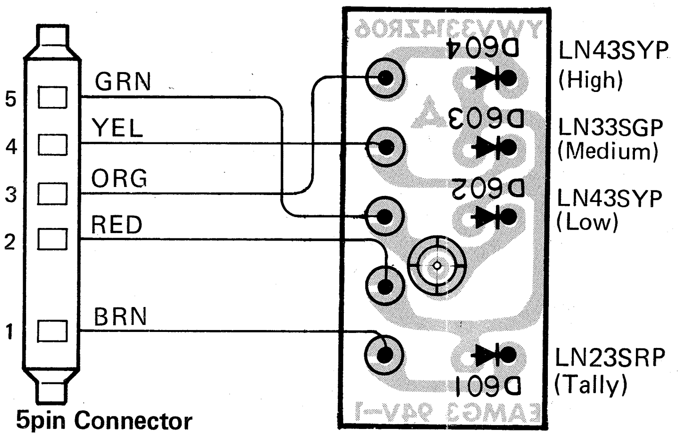


CONDUCTOR VIEW OF LIGHT INTENSITY INDICATOR LEDS CIRCUIT BOARD
(Component Side)

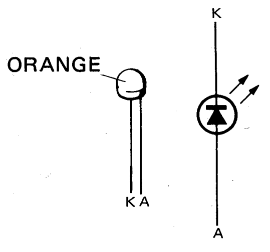
FOR VIEWFINDER OF WV-3300 (YWV3304ZK06)


1
2
3
4
5
BRN
RED
ORG
YEL
GRN
D601
D602
D603
D604
LN23SRP
(Tally)
LN43SYP
(Low)
LN33SGP
(Medium)
LN43SYP
(High)
5pin Connector

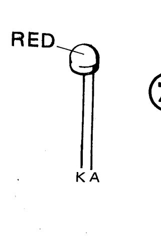
FOR VIEWFINDER OF WV-3310 (YWV3314ZK06)


5
4
3
2
1
GRN
YEL
ORG
RED
BRN
D604
D603
D602
D601
LN43SYP
(High)
LN33SGP
(Medium)
LN43SYP
(Low)
LN23SRP
(Tally)
5pin Connector

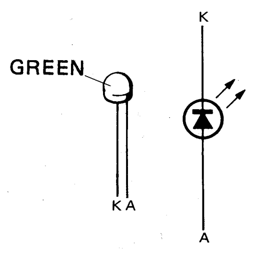
LN43SYP


ORANGE
K
K A
A

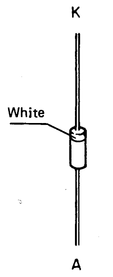
LN23SRP



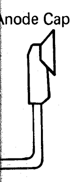
LN33SGP

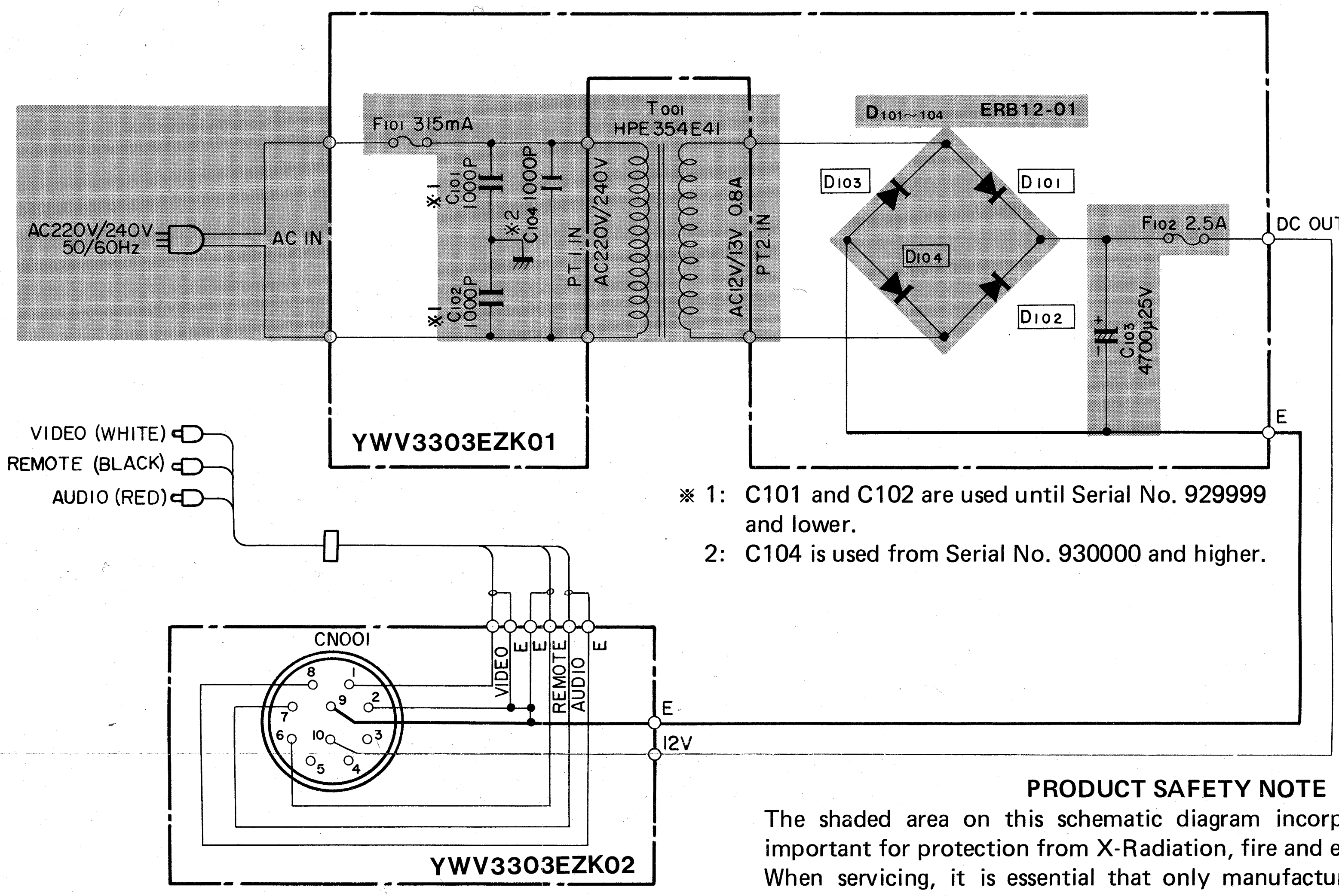


ERB12–01



SCHEMATIC DIAGRAM OF AC ADAPTOR (WV-3303E)





AC220V/240V
50/60Hz
AC IN
F101 315mA
※1 C101 1000P
※2 C104 1000P
※1 C102 1000P
PT1 IN
AC220V/240V
T001
HPE354E41
AC12V/13V 0.8A
PT2 IN
D101~104 ERB12-01
D103
D101
D104
D102
F102 2.5A
DC OUT
C103 4700μ25V
E
YWV3303EZK01
VIDEO (WHITE)
REMOTE (BLACK)
AUDIO (RED)
CN001
VIDEO
E
E
REMOTE
AUDIO
E
E
12V
YWV3303EZK02

※ 1: C101 and C102 are used until Serial No. 929999 and lower.

2: C104 is used from Serial No. 930000 and higher.

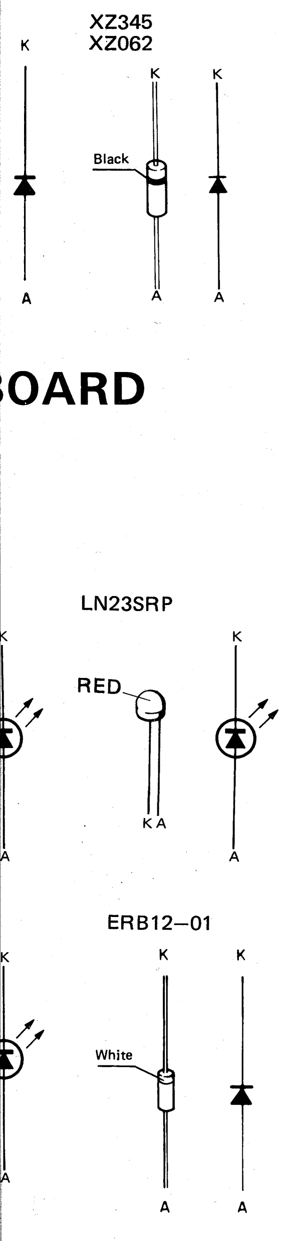
PRODUCT SAFETY NOTE

The shaded area on this schematic diagram incorporates special features important for protection from X-Radiation, fire and electrical shock hazards. When servicing, it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.

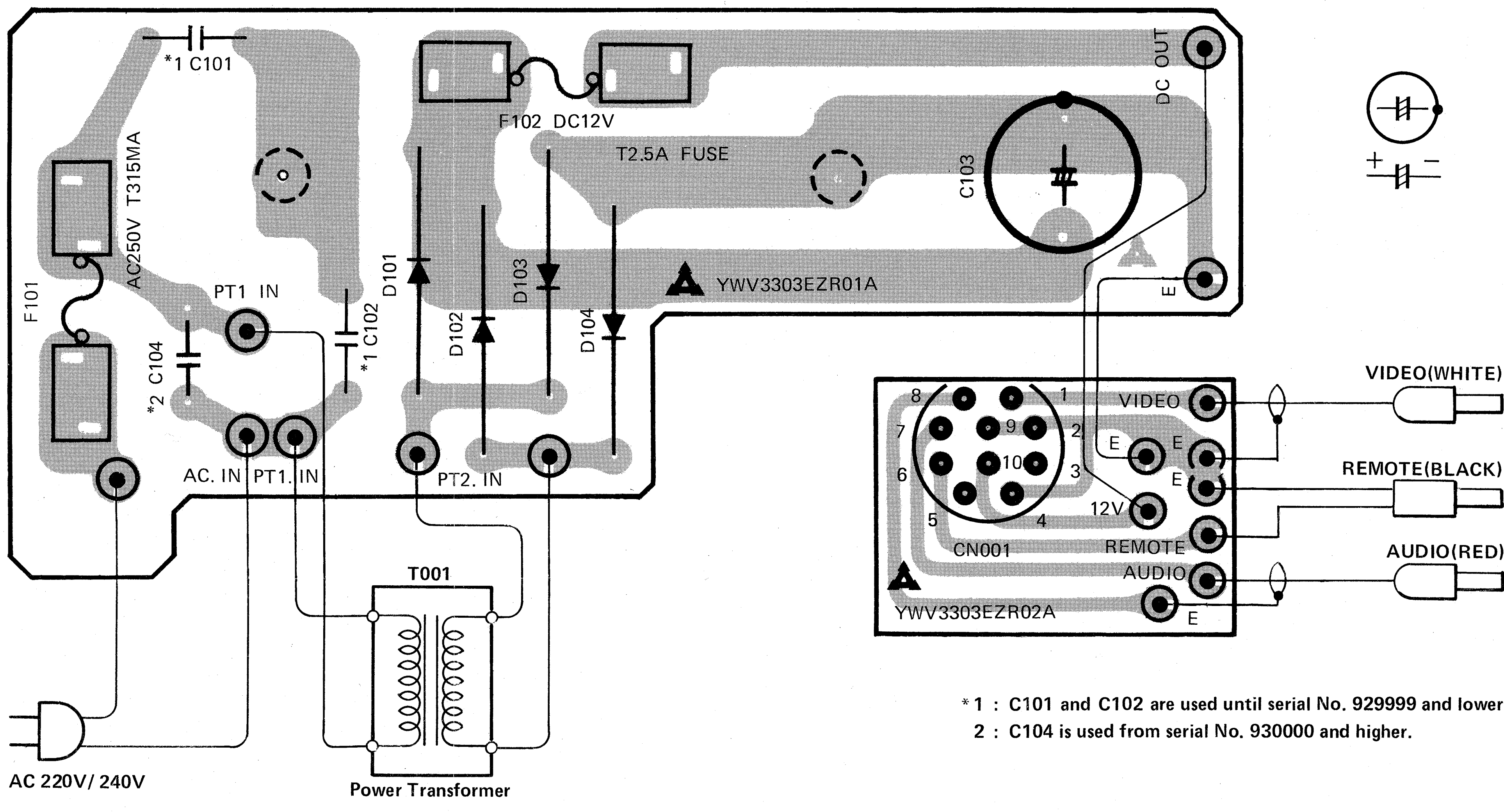
Notes: 1. Do not order components by Part No. written on the schematic diagram or conductor view of P. C. B. Use replacement parts list.

CONDUCTOR VIEW OF AC ADAPTOR (WV-3303E)

(Component Side)



XZ345
XZ062
K
Black
A
OARD
LN23SRP
RED
K A
ERB12–01
White

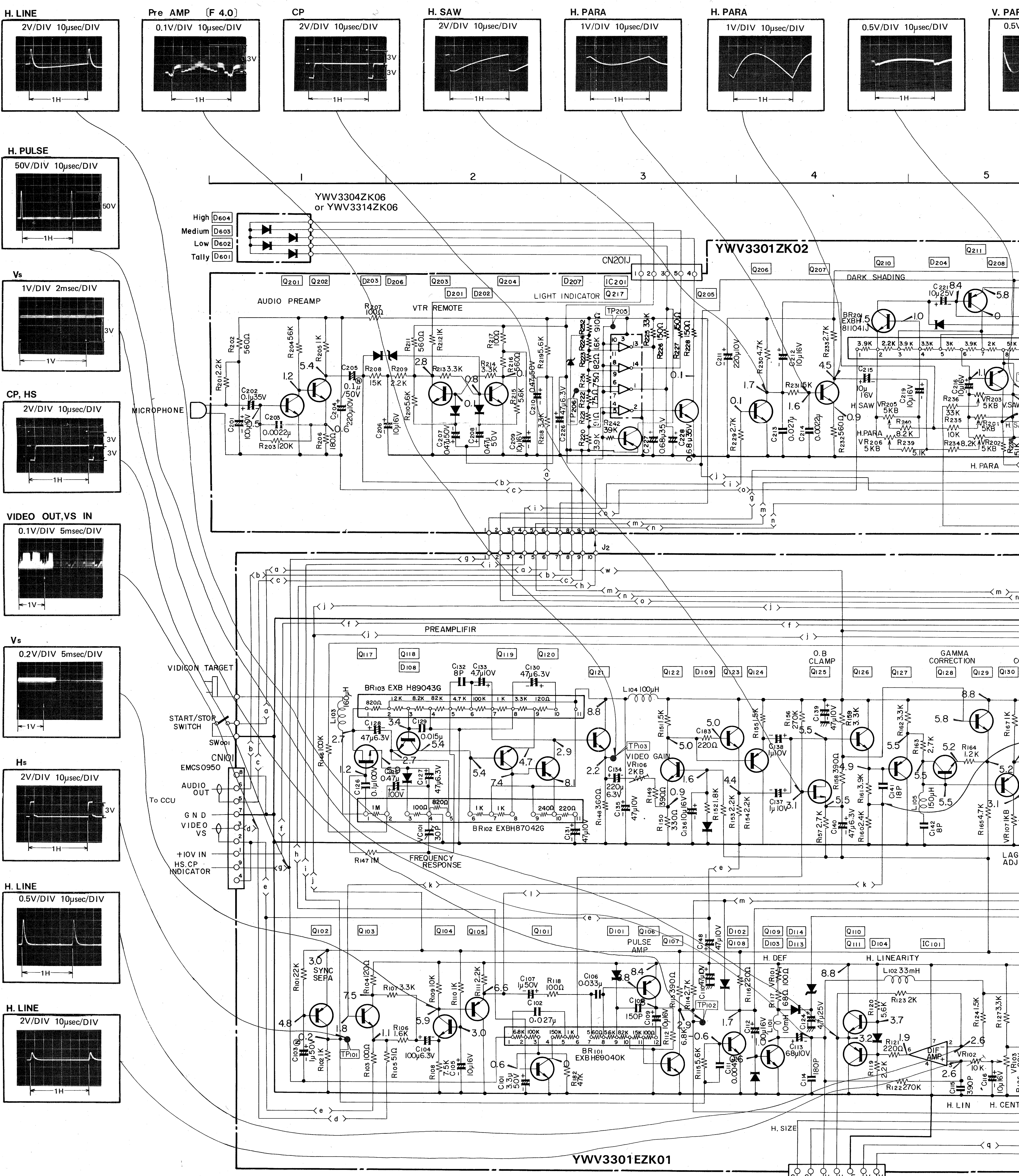


*1 C101
AC250V T315MA
F101
PT1 IN
*2 C104
*1 C102
AC. IN
PT1. IN
F102 DC12V
T2.5A FUSE
D101
D102
D103
D104
PT2. IN
C103
DC OUT
E
YWV3303EZR01A
T001
Power Transformer
AC 220V/ 240V
8
1
7
9
2
6
10
3
5
4
VIDEO
E
E
E
12V
REMOTE
AUDIO
E
CN001
YWV3303EZR02A
VIDEO(WHITE)
REMOTE(BLACK)
AUDIO(RED)

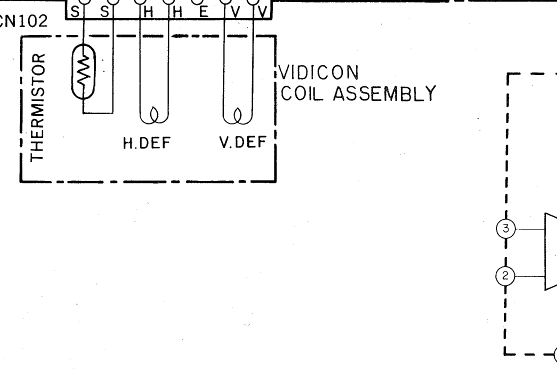
*1 : C101 and C102 are used until serial No. 929999 and lower

2 : C104 is used from serial No. 930000 and higher.

SCHEMATIC DIAGRAM OF C
(YWV3301EZK01, YWV3301ZK02, YW



H. LINE
2V/DIV 10μsec/DIV
Pre AMP (F 4.0)
0.1V/DIV 10μsec/DIV
CP
2V/DIV 10μsec/DIV
H. SAW
2V/DIV 10μsec/DIV
H. PARA
1V/DIV 10μsec/DIV
H. PARA
1V/DIV 10μsec/DIV
0.5V/DIV 10μsec/DIV
V. PAR
H. PULSE
50V/DIV 10μsec/DIV
Vs
1V/DIV 2msec/DIV
CP, HS
2V/DIV 10μsec/DIV
VIDEO OUT,VS IN
0.1V/DIV 5msec/DIV
Vs
0.2V/DIV 5msec/DIV
Hs
2V/DIV 10μsec/DIV
H. LINE
0.5V/DIV 10μsec/DIV
H. LINE
2V/DIV 10μsec/DIV
1H
1V
3V
50V
1
2
3
4
5
YWV3304ZK06
or YWV3314ZK06
High D604
Medium D603
Low D602
Tally D601
YWV3301ZK02
CN201J
AUDIO PREAMP
VTR REMOTE
LIGHT INDICATOR
DARK SHADING
MICROPHONE
H. PARA
H SAW
J2
PREAMPLIFIR
VIDICON TARGET
START/STOP SWITCH
SW001
CN101
EMCS0950
AUDIO OUT
To CCU
GND
VIDEO VS
+10V IN
HS.CP INDICATOR
O.B CLAMP
GAMMA CORRECTION
VIDEO GAIN
FREQUENCY RESPONSE
BR103 EXB H89043G
BR102 EXBH87042G
BR101 EXBH69040K
SYNC SEPA
PULSE AMP
H. DEF
H. LINEARITY
DIF AMP
H. LIN
H. CENT
H. SIZE
LAG ADJ
YWV3301EZK01



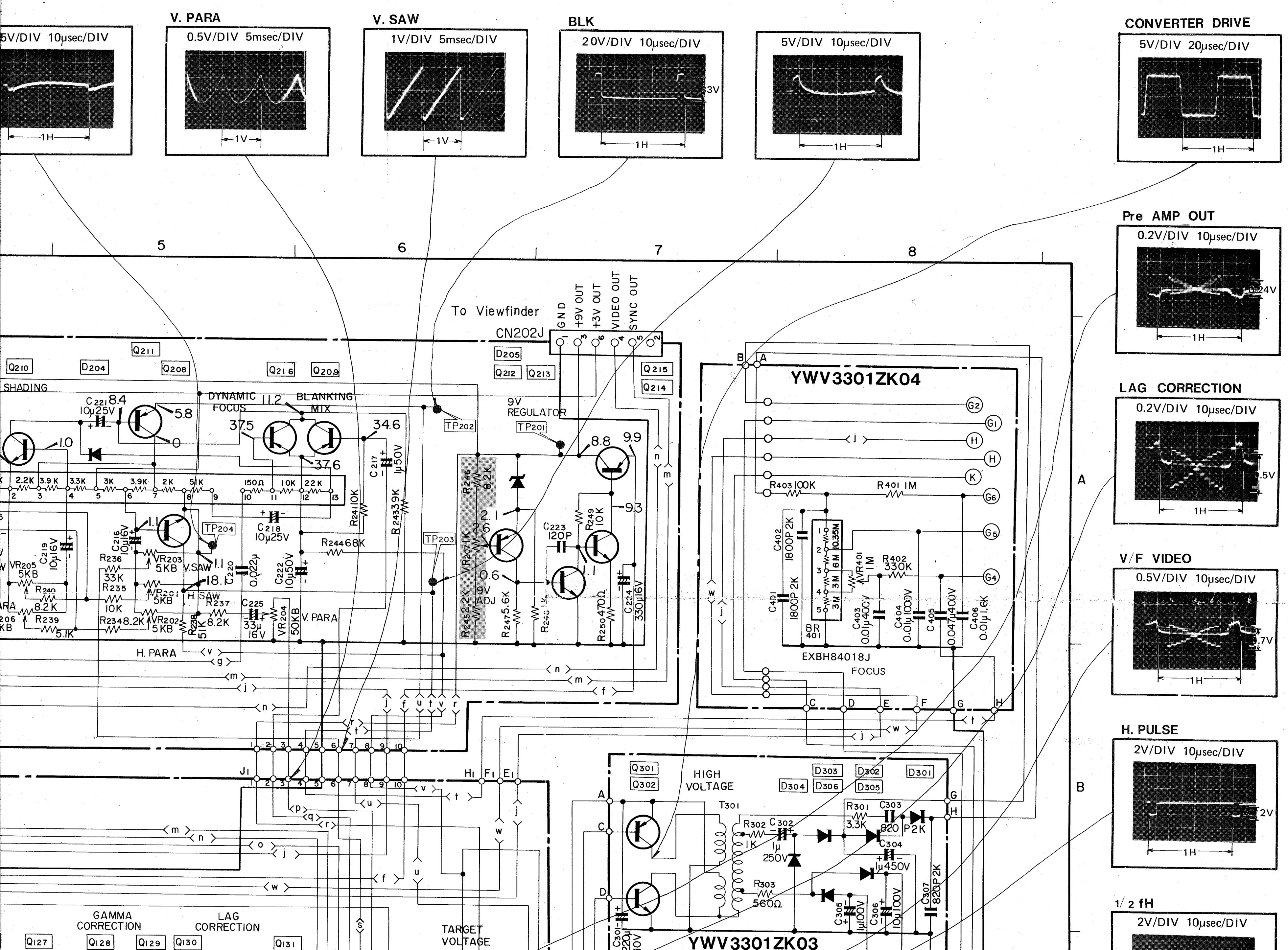
CN102
S S H H E V V
THERMISTOR
VIDICON COIL ASSEMBLY
H.DEF
V.DEF

PRODUCT SAFETY NOTE

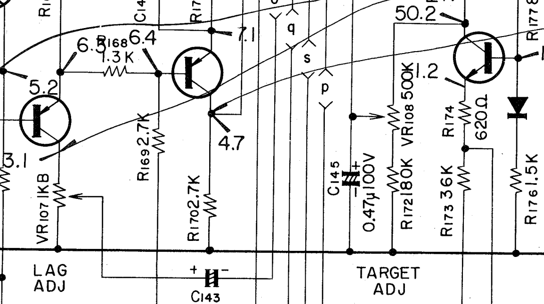
The shaded area on this schematic incorporates special features important for protection from X-radiation, fire and electrical shock hazards.
When servicing, it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.

Notes:
1. Do not order components by Part No. written on schematic diagram or conductor view of P. C. B. Use replacement parts list.
2. DC voltages are measured with digital voltmeter to chassis.

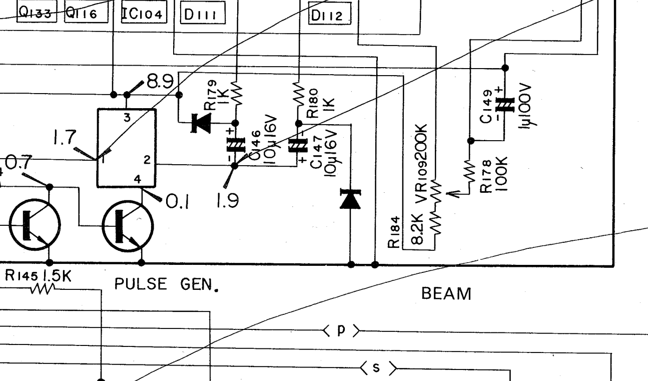
AGRAM OF CAMERA HEAD
301ZK02, YWV3301ZK03, YWV3301ZK04)


5V/DIV 10μsec/DIV
1H
V. PARA
0.5V/DIV 5msec/DIV
1V
V. SAW
1V/DIV 5msec/DIV
1V
BLK
20V/DIV 10μsec/DIV
3V
1H
5V/DIV 10μsec/DIV
1H
CONVERTER DRIVE
5V/DIV 20μsec/DIV
1H
Pre AMP OUT
0.2V/DIV 10μsec/DIV
0.24V
1H
LAG CORRECTION
0.2V/DIV 10μsec/DIV
0.5V
1H
V/F VIDEO
0.5V/DIV 10μsec/DIV
0.7V
1H
H. PULSE
2V/DIV 10μsec/DIV
2V
1H
1/2 fH
2V/DIV 10μsec/DIV
2V
1H
V. DEF
0.2V/DIV 2msec/DIV
1V
1V/DIV 2msec/DIV
1V
0.2V/DIV 2msec/DIV
1V
5
6
7
8
A
B
C
D
To Viewfinder
CN202J
GND
+9V OUT
+3V OUT
VIDEO OUT
SYNC OUT
SHADING
DYNAMIC FOCUS
BLANKING MIX
9V REGULATOR
TP201
TP202
TP203
TP204
V.SAW
H SAW
V. PARA
H. PARA
VR201 1K 9V ADJ
YWV3301ZK04
FOCUS
EXBH84018J
BR 401
R403 100K
R401 1M
R402 330K
VR401 1M
HIGH VOLTAGE
T301
YWV3301ZK03
GAMMA CORRECTION
LAG CORRECTION
TARGET VOLTAGE
LAG ADJ
TARGET ADJ
PULSE GEN.
BEAM
L106 390μ
LINEARITY
L102 33mH
V. DEF
DIF AMP
V. SAW AMP
3V REGULATOR
H. LIN
H. CENT
V. SIZE
V. CENT
J1
VIDICON COIL ASSEMBLY

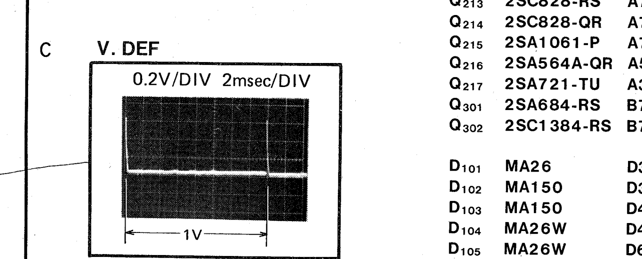
CA3140


BIAS CIRCUIT CURRENT SOURCES And REGULATOR
A=10
A=10,000
A=1
7
3
2
6
4
5
1
8

NJM4558

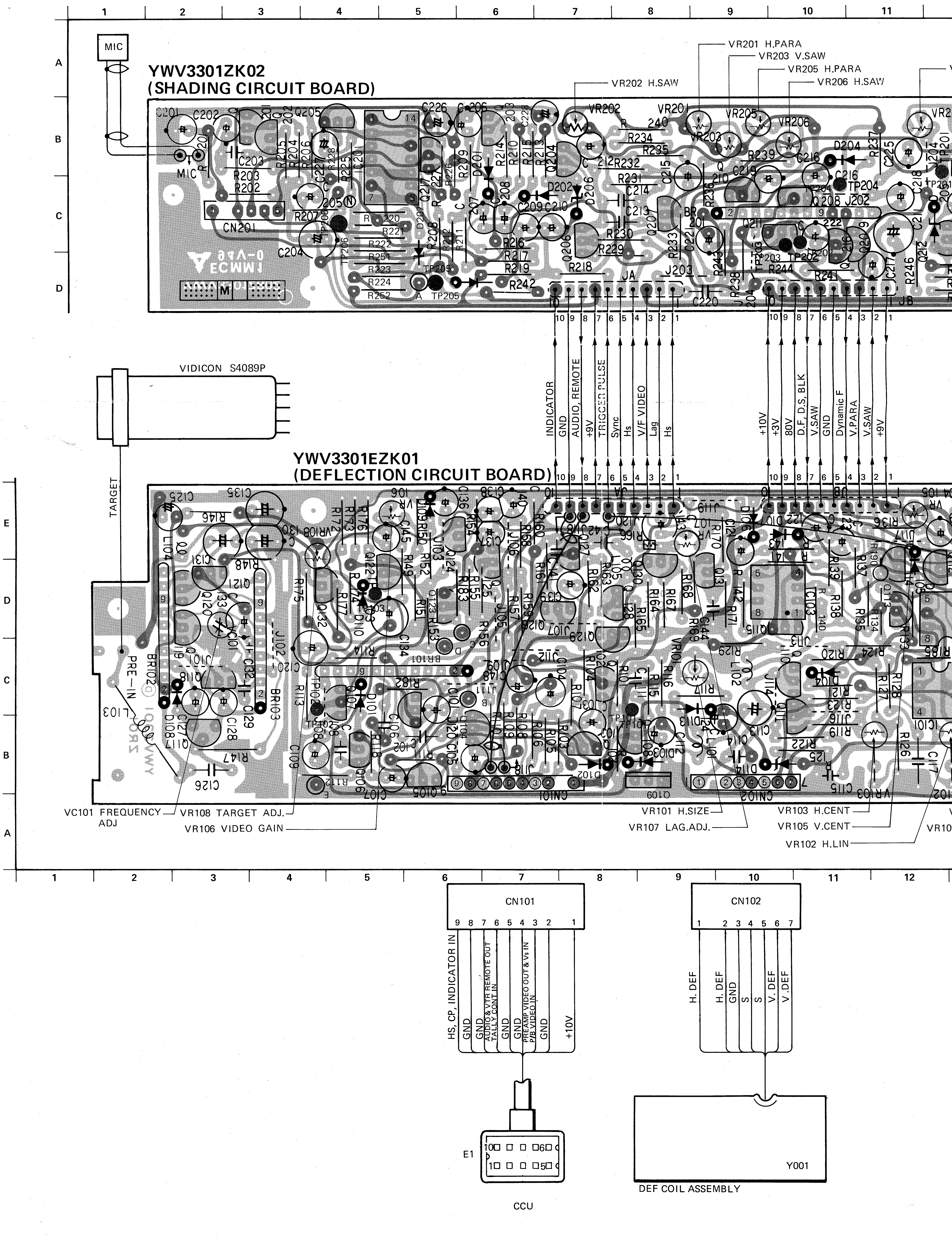


DN-819



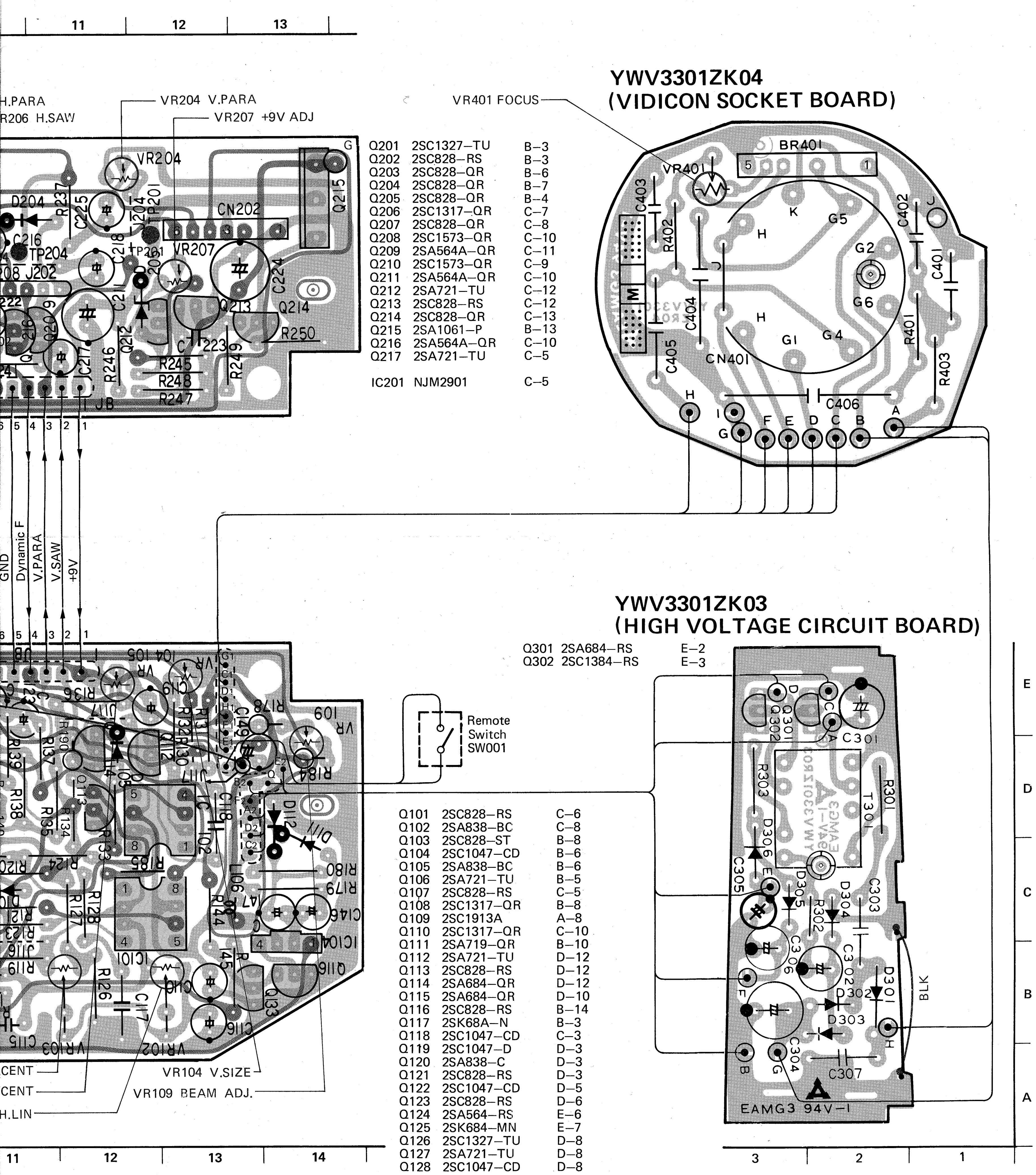
IC_{101}	CA3140E	D
IC_{102}	CA3140E	D
IC_{103}	NJM4558D	D
IC_{104}	DN819	C
IC_{201}	NJM2901N	A
Q_{101}	2SC828-RS	D
Q_{102}	2SA838-BC	D
Q_{103}	2SC828-ST	D
Q_{104}	2SC1047-CD	D
Q_{105}	2SA838-BC	D
Q_{106}	2SA721-TU	D
Q_{107}	2SC828-RS	D
Q_{108}	2SC1317-QR	D
Q_{109}	2SC1913A-QR	D
Q_{110}	2SC1317-QR	D
Q_{111}	2SA719-QR	D
Q_{112}	2SA721-TU	D
Q_{113}	2SC1384-RS	D
Q_{114}	2SA684-QR	D
Q_{115}	2SA684-QR	D
Q_{116}	2SC828-RS	C
Q_{117}	2SK68A-N	C
Q_{118}	2SC1047-CD	C
Q_{119}	2SC1047-D	C
Q_{120}	2SA838-C	C
Q_{121}	2SC828-RS	C
Q_{122}	2SC1047-CD	C
Q_{123}	2SC828-RS	C
Q_{124}	2SA564-RS	C
Q_{125}	2SK68A-MN	C
Q_{126}	2SC1327-TU	C
Q_{127}	2SA721-TU	C
Q_{128}	2SC1047-CD	C
Q_{129}	2SC1327-TU	C
Q_{130}	2SA838-BC	C
Q_{131}	2SA838-BC	C
Q_{132}	2SC1573-QR	C
Q_{133}	2SC828-RS	C
Q_{201}	2SC1327-TU	A
Q_{202}	2SC828-RS	A
Q_{203}	2SC828-QR	A
Q_{204}	2SC828-QR	A
Q_{205}	2SC828-QR	A
Q_{206}	2SC1317-QR	A
Q_{207}	2SC828-QR	A
Q_{208}	2SC1573-QR	A
Q_{209}	2SA564A-QR	A
Q_{210}	2SC1573-QR	A
Q_{211}	2SA564A-QR	A
Q_{212}	2SA721-TU	A
Q_{213}	2SC828-RS	A
Q_{214}	2SC828-QR	A
Q_{215}	2SA1061-P	A
Q_{216}	2SA564A-QR	A
Q_{217}	2SA721-TU	A
Q_{301}	2SA684-RS	B
Q_{302}	2SC1384-RS	B
D_{101}	MA26	D
D_{102}	MA150	D
D_{103}	MA150	D
D_{104}	MA26W	D
D_{105}	MA26W	D
D_{106}	MA150	D
D_{107}	MA150	D
D_{108}	MA26W	C
D_{109}	MA26	C
D_{110}	MA26	C
D_{111}	MA150	C
D_{112}	MA150	C
D_{113}	MA150	D
D_{114}	XZ070	D
D_{201}	MA150	A
D_{202}	MA150	A
D_{203}	MA150	A
D_{204}	MA150	A
D_{205}	XZ062E	A
D_{206}	XZ068	A
D_{301}	SIR150	B
D_{302}	SIR150	B
D_{303}	SIR60	B
D_{304}	SIR60	B
D_{305}	ERB12-02	B
D_{306}	ERB12-02	B
D_{207}	XZ055	A

CONDUCTOR VIEW OF CAMERA HEAD (YW



MIC
YWV3301ZK02
(SHADING CIRCUIT BOARD)
VR201 H.PARA
VR203 V.SAW
VR205 H.PARA
VR206 H.SAW
VR202 H.SAW
CN201
TP205
TP206
J203
JA
JB
VIDICON S4089P
TARGET
INDICATOR
GND
AUDIO, REMOTE
+9V
TRIGGER PULSE
Sync
Hs
V/F VIDEO
Lag
Hs
+10V
+3V
80V
D.F, D.S, BLK
V.SAW
GND
Dynamic F
V.PARA
V.SAW
+9V
YWV3301EZK01
(DEFLECTION CIRCUIT BOARD)
PRE-IN
CN101
CN102
VC101 FREQUENCY ADJ
VR108 TARGET ADJ.
VR106 VIDEO GAIN
VR101 H.SIZE
VR107 LAG.ADJ.
VR103 H.CENT
VR105 V.CENT
VR102 H.LIN
CN101
9 8 7 6 5 4 3 2 1
HS, CP, INDICATOR IN
GND
AUDIO & VTR REMOTE OUT TALLY CONT IN
GND
PREAMP VIDEO OUT & Vs IN P/B VIDEO IN
GND
+10V
CN102
1 2 3 4 5 6 7
H. DEF
H. DEF
GND
S
S
V. DEF
V. DEF
E1
CCU
Y001
DEF COIL ASSEMBLY

HEAD (YWV3301EZK01, ZK02, ZK03, ZK04) (Component Side)


11
12
13
H.PARA
R206 H.SAW
VR204 V.PARA
VR207 +9V ADJ
VR401 FOCUS
VR204
VR207
VR401
BR401
CN202
CN401
Q215
Q213
Q214
R250
R245
R248
R247
R246
C224
C225
D204
TP204
TP201
J202
JB
6 5 4 3 2 1
GND
Dynamic F
V.PARA
V.SAW
+9V
K
H
G5
G2
G6
G1
G4
C401
C402
C403
C404
C405
C406
R401
R402
R403
H I G F E D C B A
Remote
Switch
SW001
VR 109
R178
R184
C146
IC101
IC104
Q116
Q133
C117
VR103
VR102
CENT
CENT
H.LIN
VR104 V.SIZE
VR109 BEAM ADJ.
11
12
13
14
Q301
Q302
C301
C302
C303
C304
C305
C306
C307
R301
R302
R303
T301
D301
D302
D303
D304
D305
D306
BLK
EAMG3 94V-I
E
D
C
B
A
3
2
1

Q201	2SC1327–TU	B–3
Q202	2SC828–RS	B–3
Q203	2SC828–QR	B–6
Q204	2SC828–QR	B–7
Q205	2SC828–QR	B–4
Q206	2SC1317–QR	C–7
Q207	2SC828–QR	C–8
Q208	2SC1573–QR	C–10
Q209	2SA564A–QR	C–11
Q210	2SC1573–QR	C–9
Q211	2SA564A–QR	C–10
Q212	2SA721–TU	C–12
Q213	2SC828–RS	C–12
Q214	2SC828–QR	C–13
Q215	2SA1061–P	B–13
Q216	2SA564A–QR	C–10
Q217	2SA721–TU	C–5
IC201	NJM2901	C–5

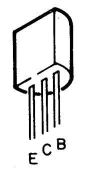
YWV3301ZK04
(VIDICON SOCKET BOARD)

YWV3301ZK03
(HIGH VOLTAGE CIRCUIT BOARD)

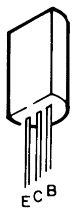
Q301	2SA684–RS	E–2
Q302	2SC1384–RS	E–3

Q101	2SC828–RS	C–6
Q102	2SA838–BC	C–8
Q103	2SC828–ST	B–8
Q104	2SC1047–CD	B–6
Q105	2SA838–BC	B–6
Q106	2SA721–TU	B–5
Q107	2SC828–RS	C–5
Q108	2SC1317–QR	B–8
Q109	2SC1913A	A–8
Q110	2SC1317–QR	C–10
Q111	2SA719–QR	B–10
Q112	2SA721–TU	D–12
Q113	2SC828–RS	D–12
Q114	2SA684–QR	D–12
Q115	2SA684–QR	D–10
Q116	2SC828–RS	B–14
Q117	2SK68A–N	B–3
Q118	2SC1047–CD	C–3
Q119	2SC1047–D	D–3
Q120	2SA838–C	D–3
Q121	2SC828–RS	D–3
Q122	2SC1047–CD	D–5
Q123	2SC828–RS	D–6
Q124	2SA564–RS	E–6
Q125	2SK684–MN	E–7
Q126	2SC1327–TU	D–8
Q127	2SA721–TU	D–8
Q128	2SC1047–CD	D–8
Q129	2SC1327–TU	C–8
Q130	2SA838–BC	D–9
Q131	2SA838–BC	D–9
Q132	2SC1573–QR	D–4
Q133	2SC828–RS	B–13
IC101	CA3140	C–12
IC102	CA3140	D–12
IC103	NJM4558	D–10
IC104	DN819	C–14

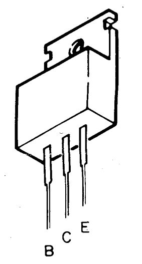
2SC828–RS, ST, QR
2SA564–RS, QR
2SA564A–QR



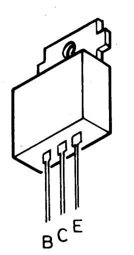
2SA838–C, BC
2SC1047–D, CD
2SA721–TU
2SC1317–QR
2SA719–QR
2SA684–QR, RS
2SC1327–TU
2SC1573–QR
2SC1384–RS



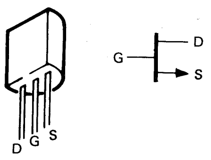
2SC1913A–QR



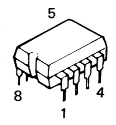
2SA1061P



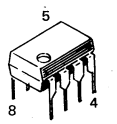
2SK68A–N, MN



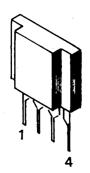
CA3140E



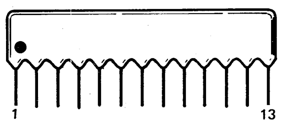
NJM4558D



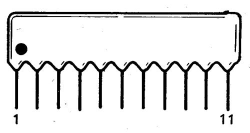
DN819



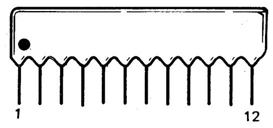
EXBH811041J



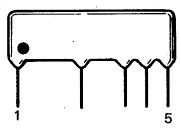
EXBH87042G
EXBH89043G



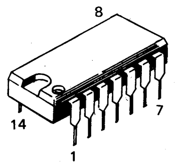
EXBH89040K



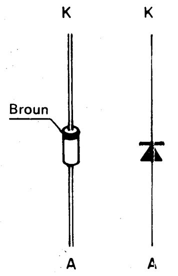
EXBH84018J



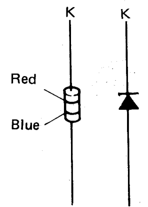
NJM2901N



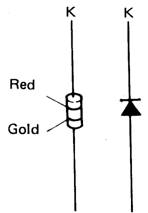
ERB12–02



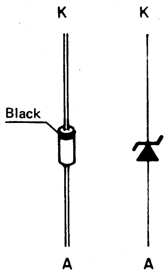
SIR60


K
K
Red
Blue
A
A

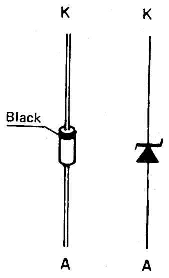
SIR150


K
K
Red
Gold
A
A

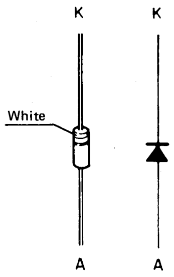
YZ062E
XZ068



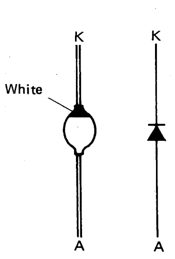
XZ070
XZ055



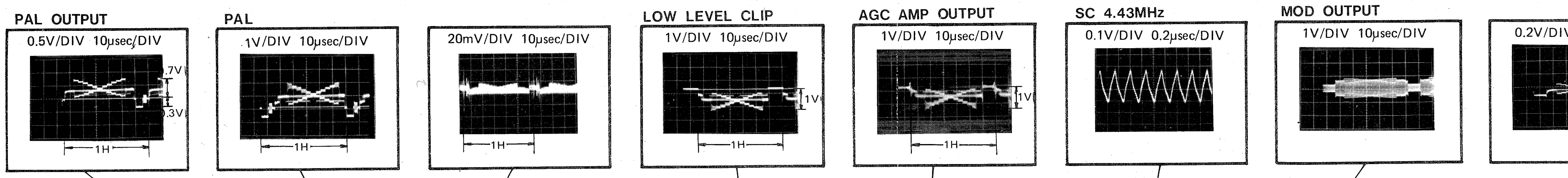
MA150



MA26
MA26W



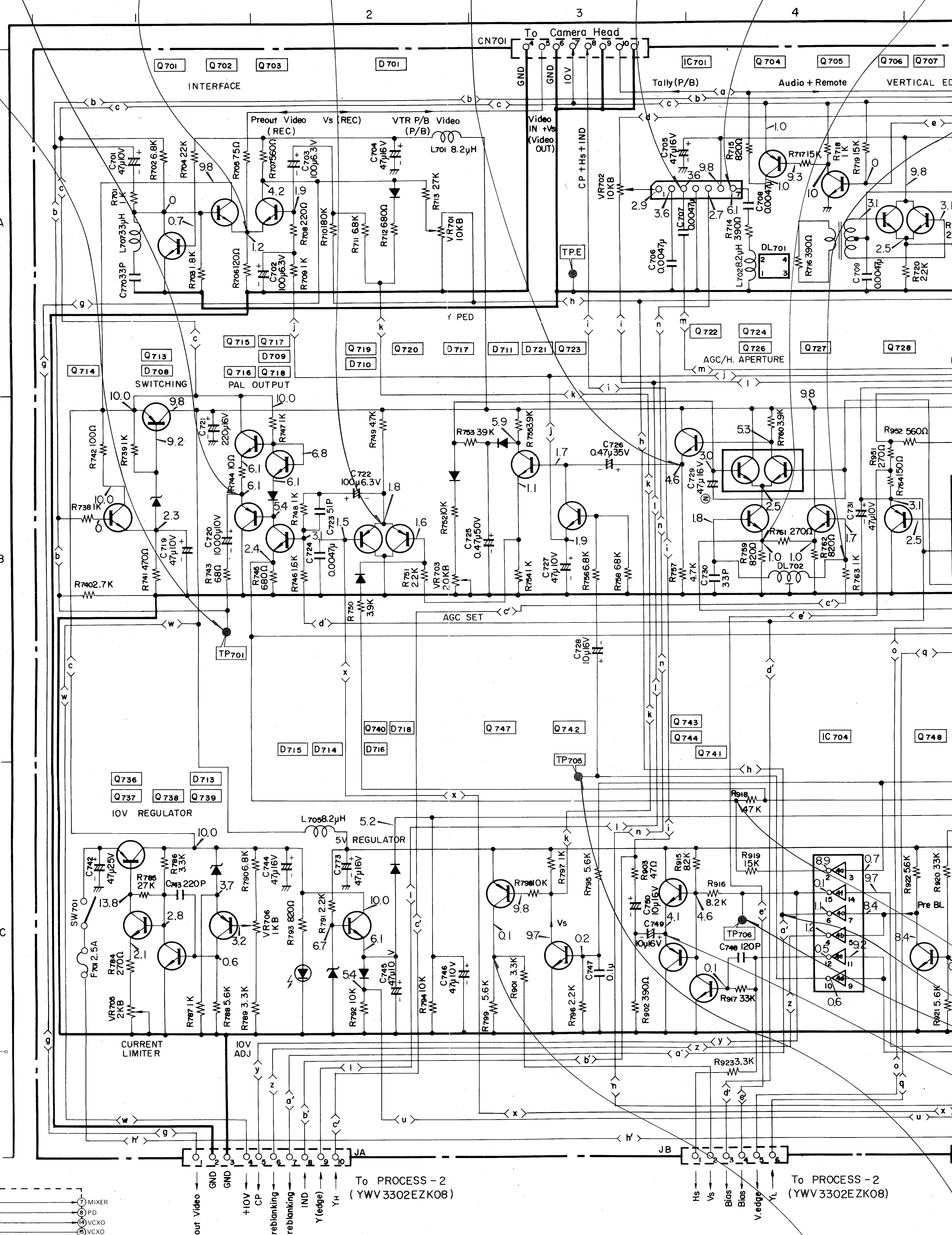
SCHEMATIC DIAGRAM OF YWV3302EZK07



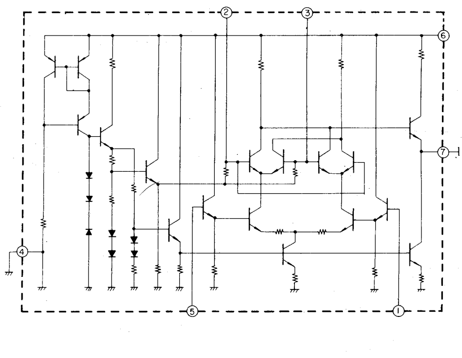
IC701	AN614	A4
IC702	AN614	B8
IC703	AN614	B7
IC704	MC14049	C4
IC705	HD74LS04	C7
IC706	HD74LS00	C8
IC707	HD74LS08	C8
IC708	HD74LS107	C8
IC709	MN6065	C6

Q701	2SC828-QR	A1
Q702	2SC828-RS	A1
Q703	2SC828-RS	A2
Q704	2SA564-RS	A4
Q705	2SC828-RS	A4
Q706	2SC1047-CD	A4
Q707	2SC1047-CD	A5
Q708	2SC828-QR	A5
Q709	2SC1047-CD	A6
Q710	2SA838-BC	A6
Q711	2SK68A-MN	A7
Q712	2SK68A-K	A7
Q713	2SA684-RS	B1
Q714	2SC1317-QR	B1
Q715	2SC1317-QR	B1
Q716	2SA719-QR	B1
Q717	2SC828-QR	B2
Q718	2SC828-QR	B2
Q719	2SA564-RS	B2
Q720	2SA564-RS	B2
Q721	2SC1327-TU	B3
Q722	2SC1047-CD	B4
Q723	2SC828-QR	B3
Q724	2SC2259-GH	B4
Q725	2SC828-QR	A6
Q726	2SC1047-CD	B4
Q727	2SC1047-CD	B4
Q728	2SA564-RS	B4
Q729	2SC1047-CD	B5
Q730	2SC828-RS	B6
Q731	2SC1047-CD	B6
Q732	2SA838-BC	B6
Q733	2SC828-QR	B6
Q734	2SC828-QR	B7
Q735	2SC828-QR	B7
Q736	2SA1061-P	C1
Q737	2SC1317-RS	C1
Q738	2SC1327-TU	C1
Q739	2SA721-TU	C1
Q740	2SC1317-QR	C2
Q741	2SC828-QR	C4
Q742	2SC1327-TU	C3
Q743	2SC828-QR	C3
Q744	2SA564-QR	C3
Q745	2SC828-QR	B7
Q746	2SC828-QR	A5
Q747	2SA564-QR	C3
Q748	2SC828-QR	C5
Q749	2SC1047-CD	C5
Q750	2SC828-QR	C6
Q751	2SC828-QR	C7
Q752	2SC828-QR	C8

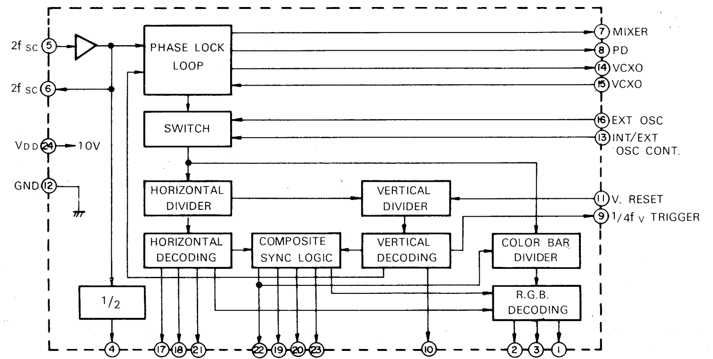
D701	MA150	A2
D702	MA150	A6
D704	MA150	A6
D705	WZ-065	A7
D706	MA150	A7
D707	MA150	A7
D708	XZ-070	B1
D709	MA150	B2
D710	MA150	B2
D711	MA150	B3
D712	OA90	B7
D713	XZ-062	C1
D714	XZ-068	C2
D715	LN23L	C2
D716	MA150	C2
D717	MA26W	B2
D718	1S1588	C2
D719	1S2139C	C6
D720	MA150	C7
D721	MA150	C7


CN701 To Camera Head
GND
GND
10V
CP + Hs + IND
INTERFACE
Preout Video (REC)
Vs (REC)
VTR P/B Video (P/B)
Video IN +Vs (Video OUT)
Tally (P/B)
Audio + Remote
VERTICAL ED
Y PED
SWITCHING
PAL OUTPUT
AGC/H. APERTURE
AGC SET
10V REGULATOR
5V REGULATOR
CURRENT LIMITER
10V ADJ
Pre BL
TP.E
TP701
TP705
TP706
JA
JB
Preout Video
GND
GND
+10V
CP
Preblanking
Preblanking
IND
Y(edge)
YH
To PROCESS-2 (YWV3302EZK08)
Hs
Vs
Bias
Bias
V.edge
YL
To PROCESS-2 (YWV3302EZK08)

AN614 (Modulator)



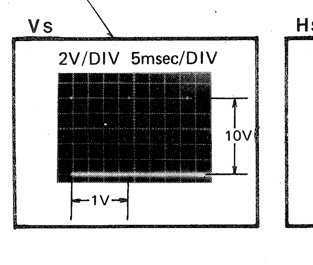
MN6065 (PAL Sync Generator)


2f sc
2f sc
VDD 10V
GND
PHASE LOCK LOOP
SWITCH
HORIZONTAL DIVIDER
VERTICAL DIVIDER
HORIZONTAL DECODING
COMPOSITE SYNC LOGIC
VERTICAL DECODING
COLOR BAR DIVIDER
R.G.B. DECODING
1/2
MIXER
PD
VCXO
VCXO
EXT OSC
INT/EXT OSC CONT.
V. RESET
1/4f v TRIGGER
SC
Hs
HD
BL
SYNC
BFP
PAL
VD
RED
GREEN
BLUE

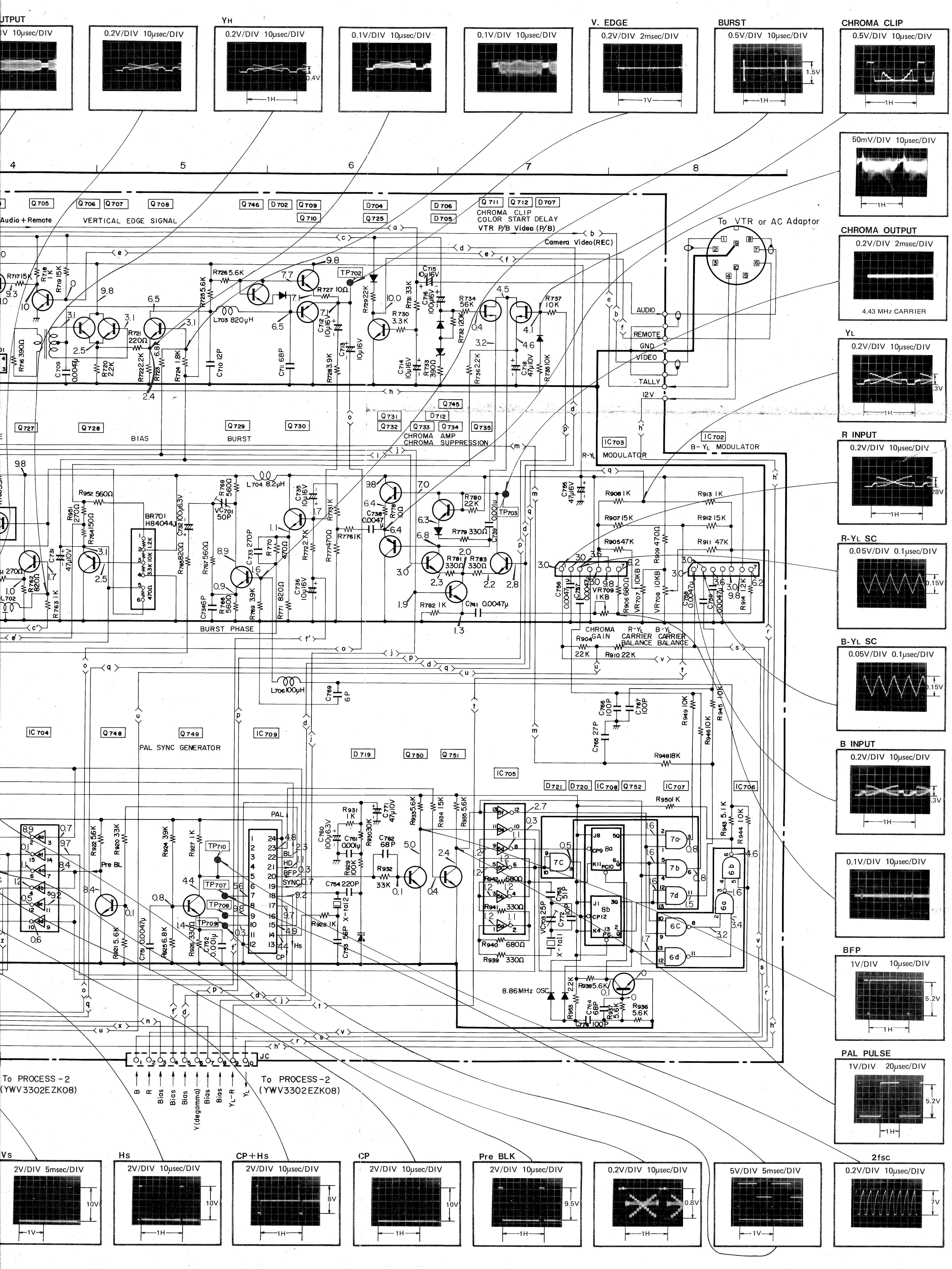
PRODUCT SAFETY NOTE

The shaded area on this schematic diagram incorporates special features important for protection from X-Radiation, fire and electrical shock hazards. When servicing, it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.

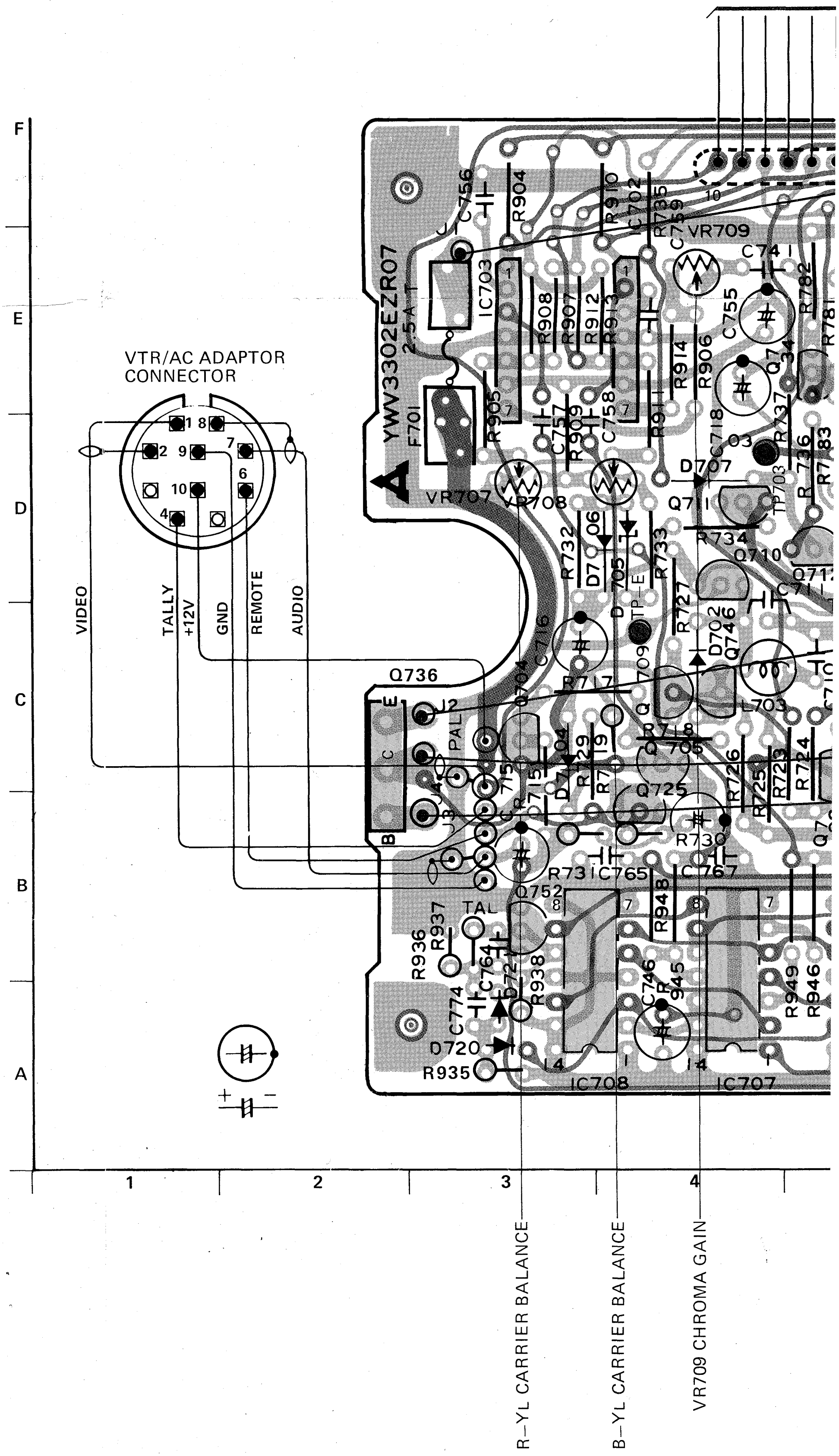
Notes:
1. Do not order components by Part No. written on the schematic diagram or conductor view of P. C. B. Use replacement parts list.
2. DC voltages are measured with digital voltmeter to chassis.



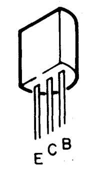
V3302EZK07 (PROCESS-1 CIRCUIT BOARD IN CCU)


UTPUT
V 10μsec/DIV
0.2V/DIV 10μsec/DIV
YH
0.2V/DIV 10μsec/DIV
0.4V
1H
0.1V/DIV 10μsec/DIV
0.1V/DIV 10μsec/DIV
V. EDGE
0.2V/DIV 2msec/DIV
1V
BURST
0.5V/DIV 10μsec/DIV
1.5V
CHROMA CLIP
0.5V/DIV 10μsec/DIV
50mV/DIV 10μsec/DIV
CHROMA OUTPUT
0.2V/DIV 2msec/DIV
4.43 MHz CARRIER
YL
0.2V/DIV 10μsec/DIV
.3V
R INPUT
0.2V/DIV 10μsec/DIV
.28V
R-YL SC
0.05V/DIV 0.1μsec/DIV
0.15V
B-YL SC
0.05V/DIV 0.1μsec/DIV
0.15V
B INPUT
0.2V/DIV 10μsec/DIV
.3V
0.1V/DIV 10μsec/DIV
BFP
1V/DIV 10μsec/DIV
5.2V
PAL PULSE
1V/DIV 20μsec/DIV
5.2V
Vs
2V/DIV 5msec/DIV
10V
Hs
2V/DIV 10μsec/DIV
10V
CP+Hs
2V/DIV 10μsec/DIV
8V
CP
2V/DIV 10μsec/DIV
10V
Pre BLK
2V/DIV 10μsec/DIV
9.5V
0.2V/DIV 10μsec/DIV
0.8V
5V/DIV 5msec/DIV
2fsc
0.2V/DIV 10μsec/DIV
7V
4
5
6
7
8
Audio + Remote
VERTICAL EDGE SIGNAL
CHROMA CLIP
COLOR START DELAY
VTR P/B Video (P/B)
Camera Video(REC)
To VTR or AC Adaptor
AUDIO
REMOTE
GND
VIDEO
TALLY
12V
BIAS
BURST
CHROMA AMP
CHROMA SUPPRESSION
R-YL MODULATOR
B-YL MODULATOR
BURST PHASE
CHROMA GAIN
R-YL CARRIER BALANCE
B-YL CARRIER BALANCE
PAL SYNC GENERATOR
8.86MHz OSC
X-tal 1
X-tal 2
TP702
TP703
TP707
TP708
TP709
TP710
BR701 H84044
IC702
IC703
IC704
IC705
IC706
IC707
IC708
IC709
Q705
Q706
Q707
Q708
Q709
Q710
Q711
Q712
Q725
Q727
Q728
Q729
Q730
Q731
Q732
Q733
Q734
Q735
Q745
Q746
Q748
Q749
Q750
Q751
Q752
D702
D704
D705
D706
D707
D712
D719
D720
D721
PAL
BL
HD
BFP
SYNC
Hs
CP
Pre BL
JC
To PROCESS-2 (YWV3302EZK08)
To PROCESS-2 (YWV3302EZK08)
B
R
Bias
Bias
Bias
Y(degamma)
Bias
Bias
YL-R
YL

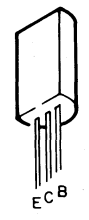
CONDUCTOR VIEW OF YWV3302EZK07 (PROCESS-1


F
E
D
C
B
A
1
2
3
4
VTR/AC ADAPTOR
CONNECTOR
1
8
2
9
7
6
10
4
3
5
VIDEO
TALLY
+12V
GND
REMOTE
AUDIO
YWV3302EZR07
2.5A T
F701
Q736
E
C
B
J2
PAL
TAL
C756
R904
R910
C702
R735
C759
VR709
C741
IC703
R908
R907
R912
R913
C755
R914
R906
R905
C757
R909
C758
R911
C718
D707
VR707
VR708
R732
R733
R734
Q710
R727
D702
Q746
C716
R717
Q705
R718
Q725
R726
R730
R731
IC765
IC767
Q752
R936
R937
C774
C754
R938
C746
R945
R948
R949
R946
D720
R935
IC708
IC707
L703
+
−
VR707 R−YL CARRIER BALANCE
VR708 B−YL CARRIER BALANCE
VR709 CHROMA GAIN

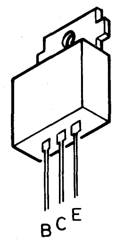
2SC828−QR, RS
2SA564−QR, RS



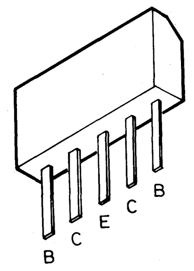
2SC1047−CD
2SA838−BC
2SA684−RS
2SC1317−QR, RS
2SA719−QR
2SC1327−TU
2SA721−TU



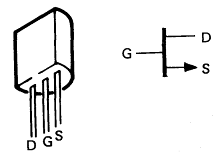
2SA1061−P



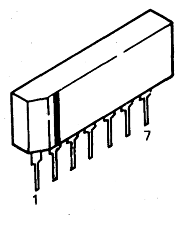
2SC2259−GH



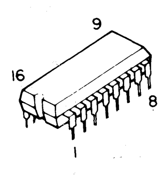
2SK68A−K, MN



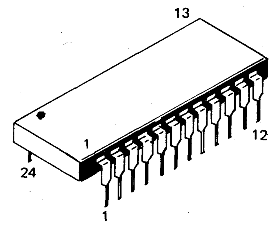
AN614



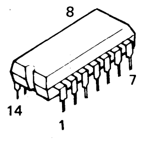
MC14049



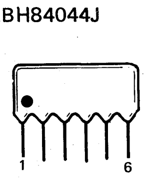
MN6065



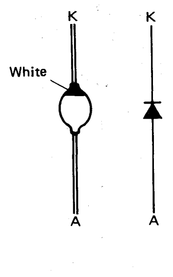
HD74LS00
HD74LS04
HD74LS08
HD74LS107



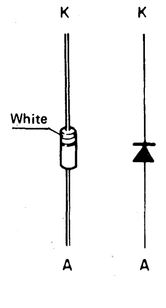
EXBH84044J



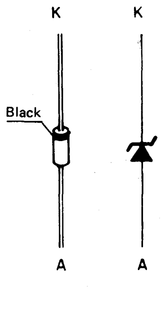
MA26W



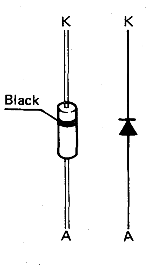
MA150−



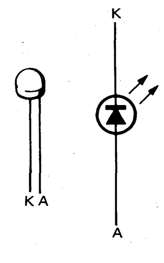
XZ070
XZ068



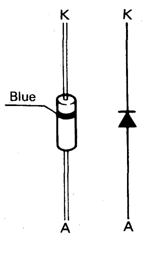
OA90
XZ062
WZ065



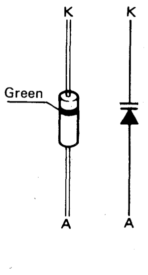
LN23L



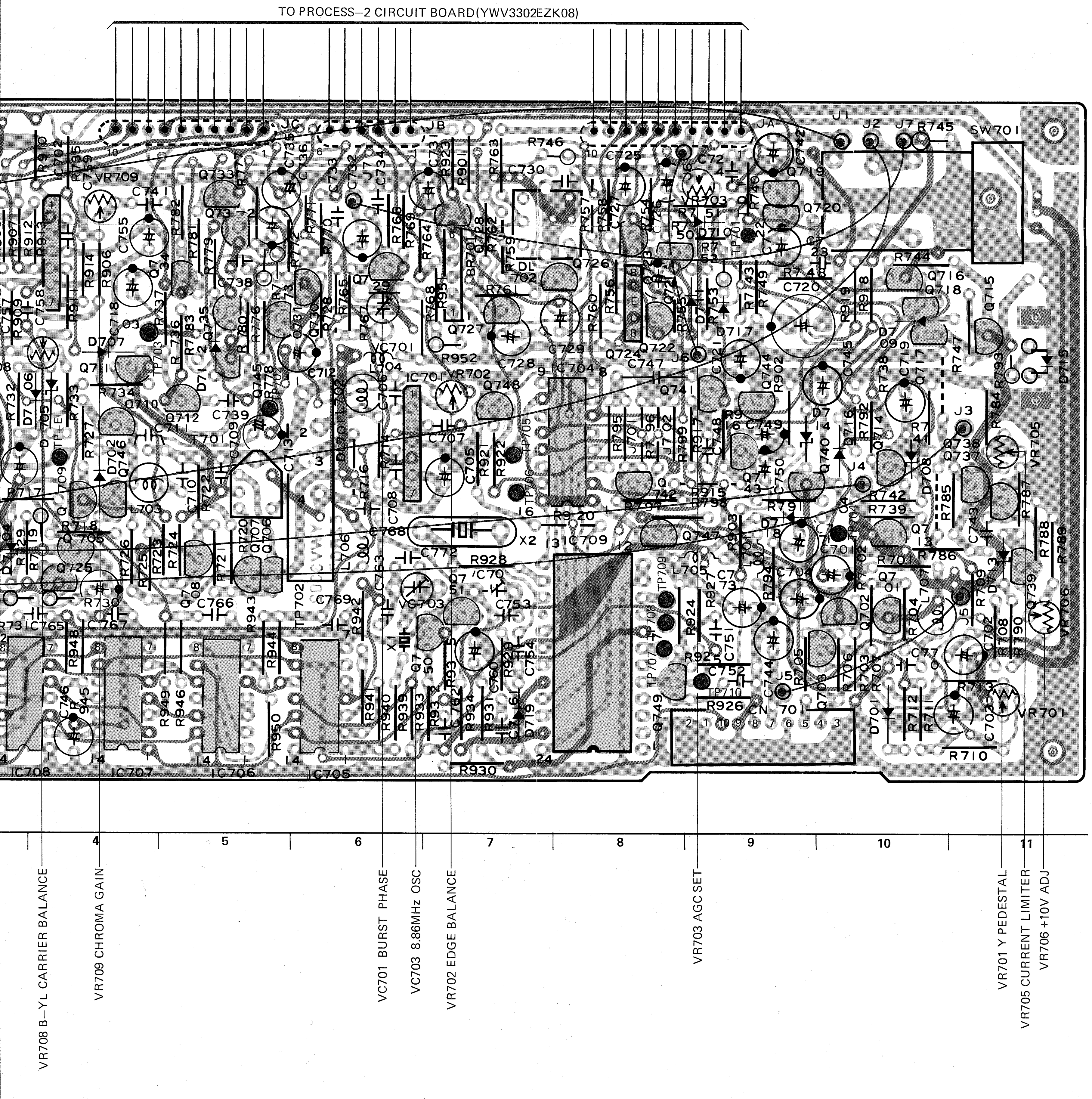
1S1588



1S2139C



(PROCESS-1 CIRCUIT BOARD) (Component Side)

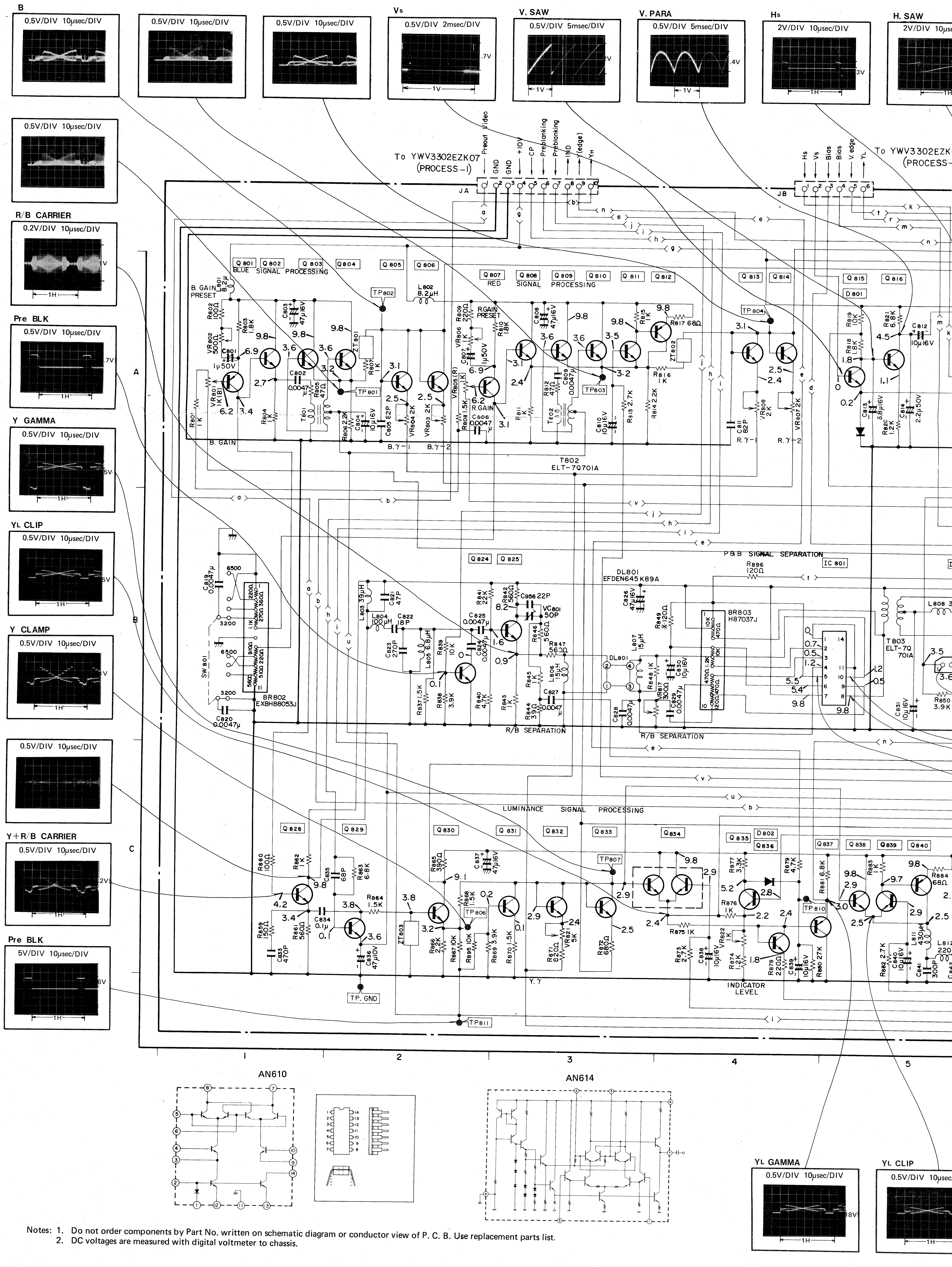

TO PROCESS–2 CIRCUIT BOARD(YWV3302EZK08)
SW701
IC701
IC704
IC705
IC706
IC707
IC708
IC709
CN 701
X1
X2
4
5
6
7
8
9
10
11
VR708 B–YL CARRIER BALANCE
VR709 CHROMA GAIN
VC701 BURST PHASE
VC703 8.86MHz OSC
VR702 EDGE BALANCE
VR703 AGC SET
VR701 Y PEDESTAL
VR705 CURRENT LIMITER
VR706 +10V ADJ

IC701	AN614	D6
IC702	AN614	E4
IC703	AN614	E3
IC704	MC14049	D8
IC705	HD74LS04	B6
IC706	HD74LS00	B5
IC707	HD74LS08	B4
IC708	HD74LS107	B3
IC709	MN6065	B8

Q701	2SC828-QR	B10
Q702	2SC828-RS	B10
Q703	2SC828-RS	B10
Q704	2SA564-RS	C3
Q705	2SC828-RS	C4
Q706	2SC1047-CD	C5
Q707	2SC1047-CD	C5
Q708	2SC828-QR	C5
Q709	2SC1047-CD	C4
Q710	2SA838-BC	D4
Q711	2SK68A-MN	D4
Q712	2SK68A-K	D5
Q713	2SA684-RS	C10
Q714	2SC1317-QR	C10
Q715	2SC1317-QR	D11
Q716	2SA719-QR	E10
Q717	2SC828-QR	D10
Q718	2SC828-QR	E10
Q719	2SA564-RS	E9
Q720	2SA564-RS	E9
Q721	2SC1327-TU	E8
Q722	2SC1047-CD	D8
Q723	2SC828-QR	E8
Q724	2SC2259-GH	D8
Q725	2SC828-QR	B4
Q726	2SC1047-CD	E8
Q727	2SC1047-CD	D7
Q728	2SA564-RS	E7
Q729	2SC1047-CD	E5
Q730	2SC828-RS	E6
Q731	2SC1047-CD	D5
Q732	2SA838-BC	E5
Q733	2SC828-QR	E5
Q734	2SC828-QR	E5
Q735	2SC828-QR	D5
Q736	2SA1061-P	C2
Q737	2SC1317-RS	C11
Q738	2SC1327-TU	C11
Q739	2SA721-TU	C11
Q740	2SC1317-QR	C9
Q741	2SC828-QR	D9
Q742	2SC1327-TU	C8
Q743	2SC828-QR	C9
Q744	2SA564-QR	D9
Q745	2SC828-QR	D5
Q746	2SC828-QR	C4
Q747	2SA564-QR	C8
Q748	2SC828-QR	D7
Q749	2SC1047-CD	B8
Q750	2SC828-QR	B7
Q751	2SC828-QR	B7
Q752	2SC828-QR	B3

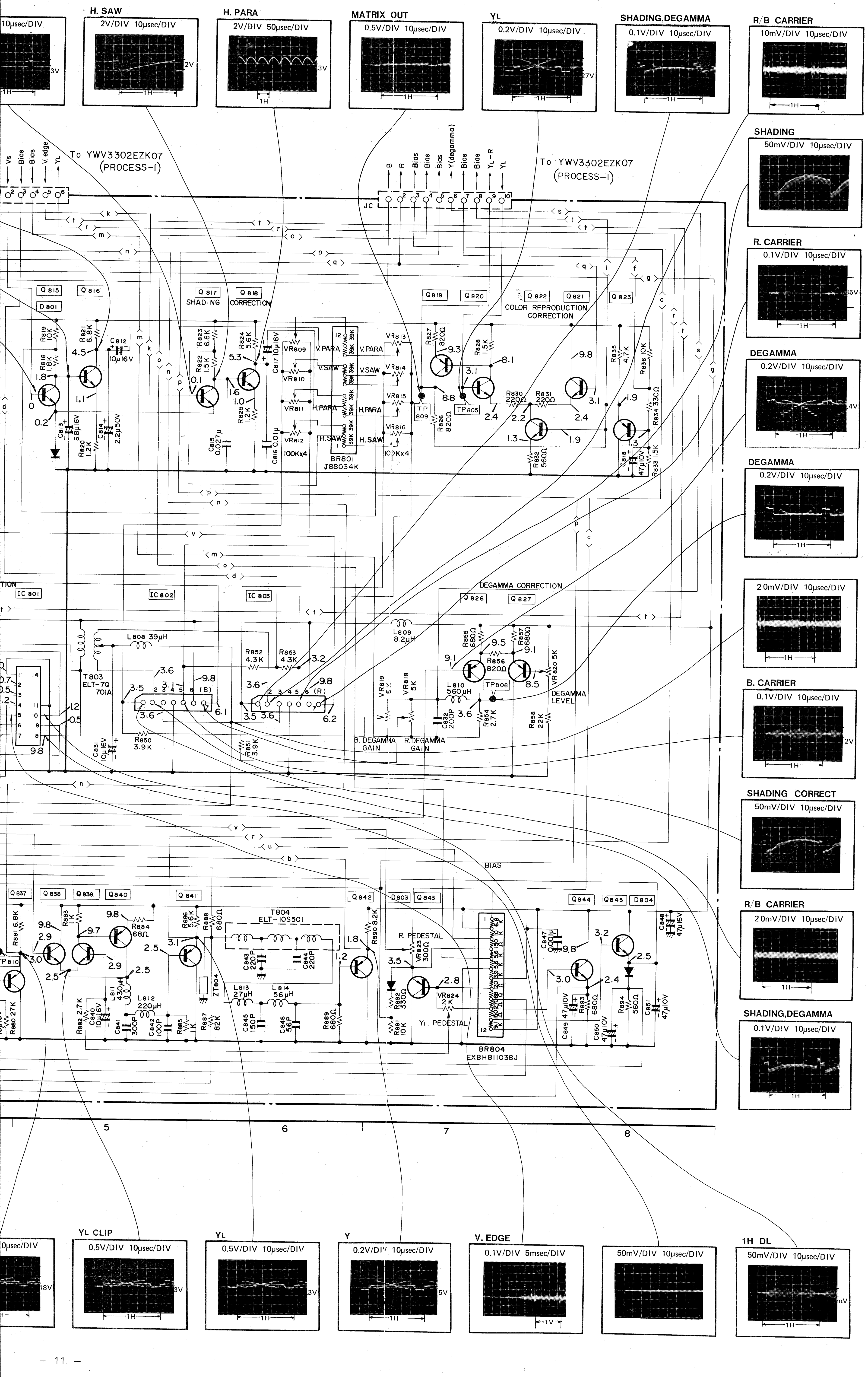
D701	MA150	A10
D702	MA150	C4
D704	MA150	C3
D705	WZ-065	D4
D706	MA150	D4
D707	MA150	D4
D708	XZ-070	C10
D709	MA150	D10
D710	MA150	E9
D711	MA150	E9
D712	OA90	D5
D713	XZ-062	C11
D714	XZ-068	D9
D715	LN23L	D9
D716	MA150	C10
D717	MA26W	E9
D718	1S1588	C9
D719	1S2139C	A7
D720	MA150	A3
D721	MA150	A3

SCHEMATIC DIAGRAM OF YWV3302EZK0


B
0.5V/DIV 10μsec/DIV
Vs
0.5V/DIV 2msec/DIV
V. SAW
0.5V/DIV 5msec/DIV
V. PARA
0.5V/DIV 5msec/DIV
Hs
2V/DIV 10μsec/DIV
H. SAW
R/B CARRIER
0.2V/DIV 10μsec/DIV
Pre BLK
Y GAMMA
YL CLIP
Y CLAMP
Y+R/B CARRIER
Pre BLK
5V/DIV 10μsec/DIV
YL GAMMA
YL CLIP
To YWV3302EZK07 (PROCESS-I)
JA
Preout video
GND
GND
+10V
CP
Preblanking
Preblanking
IND
V(edge)
YH
JB
Hs
Vs
Bias
Bias
V edge
YL
To YWV3302EZK
(PROCESS-
Q801 Q802 Q803 Q804 Q805 Q806
BLUE SIGNAL PROCESSING
Q807 Q808 Q809 Q810 Q811 Q812
RED SIGNAL PROCESSING
Q813 Q814 Q815 Q816 D801
B. GAIN PRESET
R GAIN PRESET
B. GAIN
R.GAIN
B.γ-1
B.γ-2
R.γ-1
R.γ-2
TP801 TP802 TP803 TP804
T802 ELT-7Q701A
Q824 Q825
R/B SEPARATION
P&B SIGNAL SEPARATION
IC801
DL801 EFDEN645K89A
BR803 H87037J
BR802 EXBH88053J
SW801
T803 ELT-7Q 701A
LUMINANCE SIGNAL PROCESSING
Q828 Q829 Q830 Q831 Q832 Q833 Q834 Q835 D802 Q836 Q837 Q838 Q839 Q840
TP806 TP807 TP810 TP811
TP. GND
Y.γ
INDICATOR LEVEL
A
B
C
1
2
3
4
5
AN610
AN614

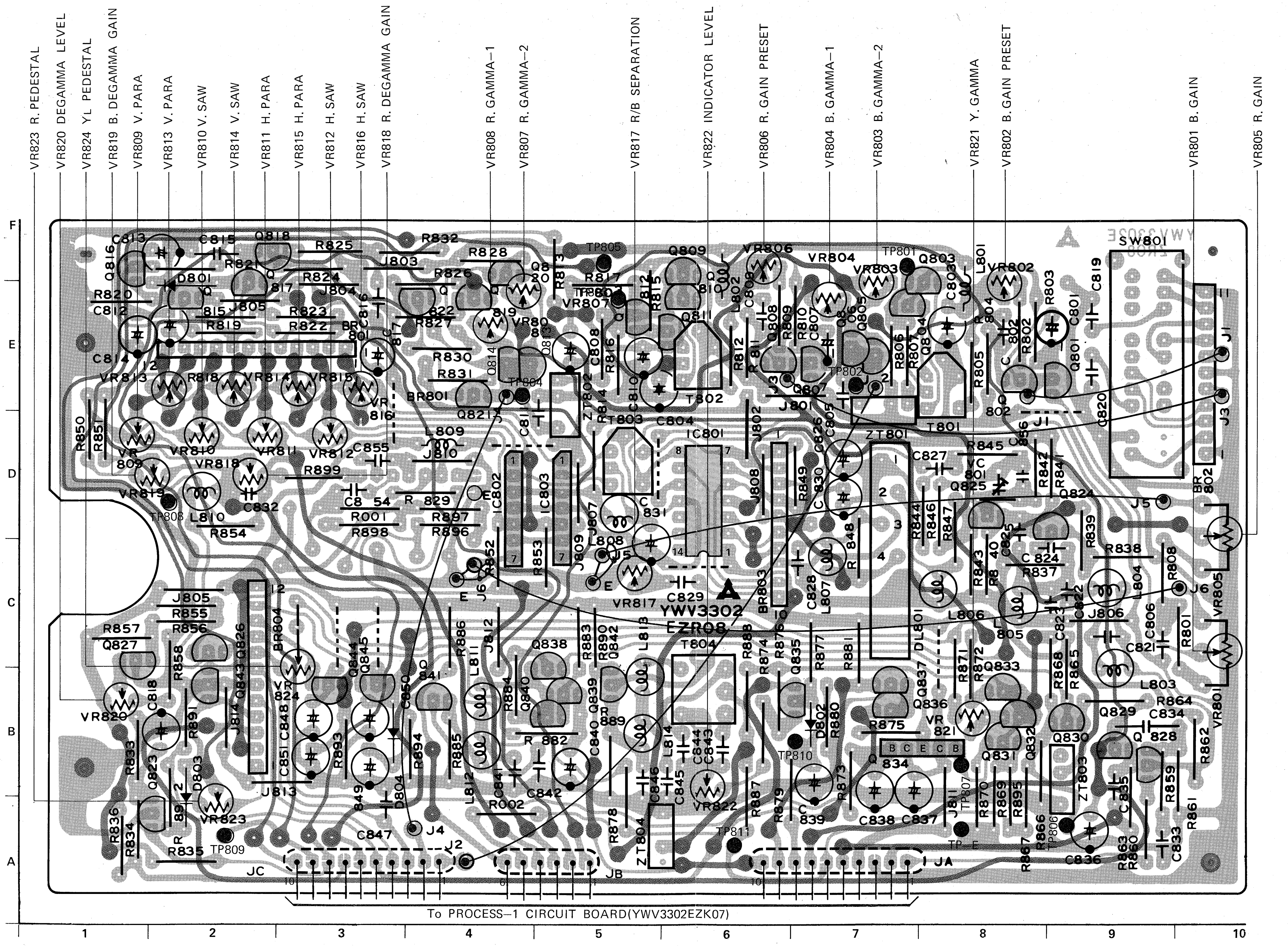
Notes: 1. Do not order components by Part No. written on schematic diagram or conductor view of P. C. B. Use replacement parts list.
2. DC voltages are measured with digital voltmeter to chassis.

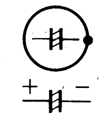
WV3302EZK08 (PROCESS-2 CIRCUIT BOARD IN CCU)


10μsec/DIV
H. SAW
2V/DIV 10μsec/DIV
H. PARA
2V/DIV 50μsec/DIV
MATRIX OUT
0.5V/DIV 10μsec/DIV
YL
0.2V/DIV 10μsec/DIV
SHADING,DEGAMMA
0.1V/DIV 10μsec/DIV
R/B CARRIER
10mV/DIV 10μsec/DIV
SHADING
50mV/DIV 10μsec/DIV
R. CARRIER
0.1V/DIV 10μsec/DIV
DEGAMMA
0.2V/DIV 10μsec/DIV
DEGAMMA
0.2V/DIV 10μsec/DIV
20mV/DIV 10μsec/DIV
B. CARRIER
0.1V/DIV 10μsec/DIV
SHADING CORRECT
50mV/DIV 10μsec/DIV
R/B CARRIER
20mV/DIV 10μsec/DIV
SHADING,DEGAMMA
0.1V/DIV 10μsec/DIV
To YWV3302EZK07 (PROCESS-1)
To YWV3302EZK07 (PROCESS-1)
Vs
Bias
Bias
V. edge
YL
B
R
Bias
Bias
Y(degamma)
Bias
Bias
YL-R
YL
JC
Q 815
Q 816
D 801
Q 817 SHADING
Q 818 CORRECTION
Q819
Q 820
Q 822
Q 821
COLOR REPRODUCTION CORRECTION
Q 823
VR809
VR810
VR811
VR812
100Kx4
V.PARA
V.SAW
H.PARA
H.SAW
BR801
J88034K
VR813
VR814
VR815
VR816
100Kx4
TP 809
TP805
IC 801
IC 802
IC 803
DEGAMMA CORRECTION
Q 826
Q 827
L808 39μH
T803 ELT-7Q 701A
L809 8.2μH
L810 560μH
TP808
B. DEGAMMA GAIN
R.DEGAMMA GAIN
DEGAMMA LEVEL
BIAS
Q 837
Q 838
Q 839
Q 840
Q 841
Q 842
D803
Q 843
Q844
Q845
D804
T804 ELT-10S501
R. PEDESTAL
YL. PEDESTAL
BR804 EXBH811038J
5
6
7
8
YL CLIP
0.5V/DIV 10μsec/DIV
YL
0.5V/DIV 10μsec/DIV
Y
0.2V/DIV 10μsec/DIV
V. EDGE
0.1V/DIV 5msec/DIV
50mV/DIV 10μsec/DIV
1H DL
50mV/DIV 10μsec/DIV
1H
1V

IC_{801}	AN610	B5
IC_{802}	AN614	B5
IC_{803}	AN614	B6
Q_{801}	2SA838-CD	A1
Q_{802}	2SC828-QR	A1
Q_{803}	2SC1047-CD	A1
Q_{804}	2SC1047-CD	A2
Q_{805}	2SC1047-CD	A2
Q_{806}	2SC1047-CD	A2
Q_{807}	2SA838-CD	A2
Q_{808}	2SC828-QR	A3
Q_{809}	2SC1047-CD	A3
Q_{810}	2SC1047-CD	A3
Q_{811}	2SC1047-CD	A3
Q_{812}	2SA838-BC	A3
Q_{813}	2SC1047-CD	A4
Q_{814}	2SC1047-CD	A4
Q_{815}	2SC1317-RS	A5
Q_{816}	2SC828-QR	A5
Q_{817}	2SC1317-RS	A6
Q_{818}	2SC828-QR	A6
Q_{819}	2SA564-QR	A7
Q_{820}	2SC828-RS	A7
Q_{821}	2SC828-RS	A8
Q_{822}	2SC828-RS	A7
Q_{823}	2SA564-QR	A8
Q_{824}	2SC828-QR	B2
Q_{825}	2SC1047-CD	B3
Q_{826}	2SA564-QR	B7
Q_{827}	2SA564-QR	B7
Q_{828}	2SC1047-CD	C1
Q_{829}	2SC1047-CD	C2
Q_{830}	2SC1327-TU	C2
Q_{831}	2SC828-QR	C3
Q_{832}	2SC1047-CD	C3
Q_{833}	2SC1047-CD	C3
Q_{834}	2SC2259-GH	C4
Q_{835}	2SC828-QR	C4
Q_{836}	2SC1047-CD	C4
Q_{837}	2SA564-RS	C4
Q_{838}	2SC1327-TU	C5
Q_{839}	2SC1327-TU	C5
Q_{840}	2SA564-QR	C5
Q_{841}	2SA721-TU	C5
Q_{842}	2SA564-QR	C6
Q_{843}	2SA564-RS	C7
Q_{844}	2SC828-RS	C8
Q_{845}	2SC828-RS	C8
D_{801}	1S1588	A5
D_{802}	MA26W	C4
D_{803}	MA150	C7
D_{804}	MA150	C8

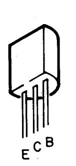
CONDUCTOR VIEW OF YWV3302EZK08 (PROCESS-2 CIRCUIT BOARD) (Component Side)


VR823 R. PEDESTAL
VR820 DEGAMMA LEVEL
VR824 YL PEDESTAL
VR819 B. DEGAMMA GAIN
VR809 V. PARA
VR813 V. PARA
VR810 V. SAW
VR814 V. SAW
VR811 H. PARA
VR815 H. PARA
VR812 H. SAW
VR816 H. SAW
VR818 R. DEGAMMA GAIN
VR808 R. GAMMA-1
VR807 R. GAMMA-2
VR817 R/B SEPARATION
VR822 INDICATOR LEVEL
VR806 R. GAIN PRESET
VR804 B. GAMMA-1
VR803 B. GAMMA-2
VR821 Y. GAMMA
VR802 B.GAIN PRESET
VR801 B. GAIN
VR805 R. GAIN
F
E
D
C
B
A
1
2
3
4
5
6
7
8
9
10
SW801
IC801
IC802
IC803
YWV3302
EZR08
JA
JB
JC
J1
J2
J3
J4
J5
J6
TP801
TP802
TP804
TP805
TP807
TP808
TP809
TP810
TP811
To PROCESS-1 CIRCUIT BOARD(YWV3302EZK07)

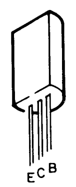


IC801	AN610	D6
IC802	AN614	D4
IC803	AN614	D5
Q801	2SA838–CD	E9
Q802	2SC828–QR	E8
Q803	2SC1047–CD	F8
Q804	2SC1047–CD	E8
Q805	2SC1047–CD	E7
Q806	2SC1047–CD	E7
Q807	2SA838–CD	E7
Q808	2SC828–QR	E6
Q809	2SC1047–CD	F6
Q810	2SC1047–CD	E6
Q811	2SC1047–CD	E6
Q812	2SA838–CD	E5
Q813	2SC1047–CD	E5
Q814	2SC1047–CD	E4
Q815	2SC1317–RS	E2
Q816	2SC828–QR	F1
Q817	2SC1317–RS	F2
Q818	2SC828–QR	F3
Q819	2SA564–QR	E4
Q820	2SC828–RS	F4
Q821	2SC828–RS	E4
Q822	2SC828–RS	E4
Q823	2SA564–QR	A2
Q824	2SC828–QR	D9
Q825	2SC1047–CD	D8
Q826	2SA564–QR	C2
Q827	2SA564–QR	C1
Q828	2SC1047–CD	B9
Q829	2SC1047–CD	B9
Q830	2SC1327–TU	B9
Q831	2SC828–QR	B8
Q832	2SC1047–CD	B8
Q833	2SC1047–CD	B8
Q834	2SC2259–GH	B7
Q835	2SC828–QR	B7
Q836	2SC1047–CD	B7
Q837	2SA564–RS	B7
Q838	2SC1327–TU	C5
Q839	2SC1327–TU	B5
Q840	2SA564–QR	B5
Q841	2SA721–TU	B4
Q842	2SA564–QR	B5
Q843	2SA564–RS	B2
Q844	2SC828–RS	B3
Q845	2SC828–RS	B3
D801	1S1588	E2
D802	MA26W	B7
D803	MA150	A2
D804	MA150	B3

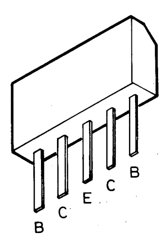
2SA564–QR, RS
2SC828–QR, RS



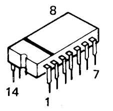
2SC1047–CD
2SA838–CD, BC
2SC1317–TU, RS
2SA721–TU
2SC1327–TU



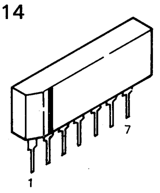
2SC2259–GH



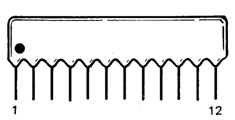
AN610



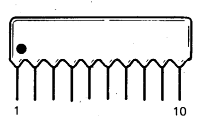
AN614



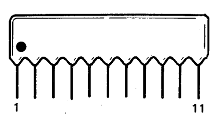
EXBJ88034K
EXBH811038J



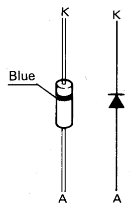
EXBH87037J



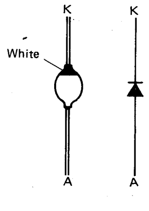
EXBH88053J



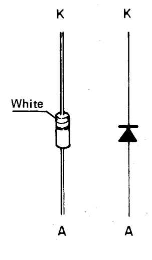
1S1588



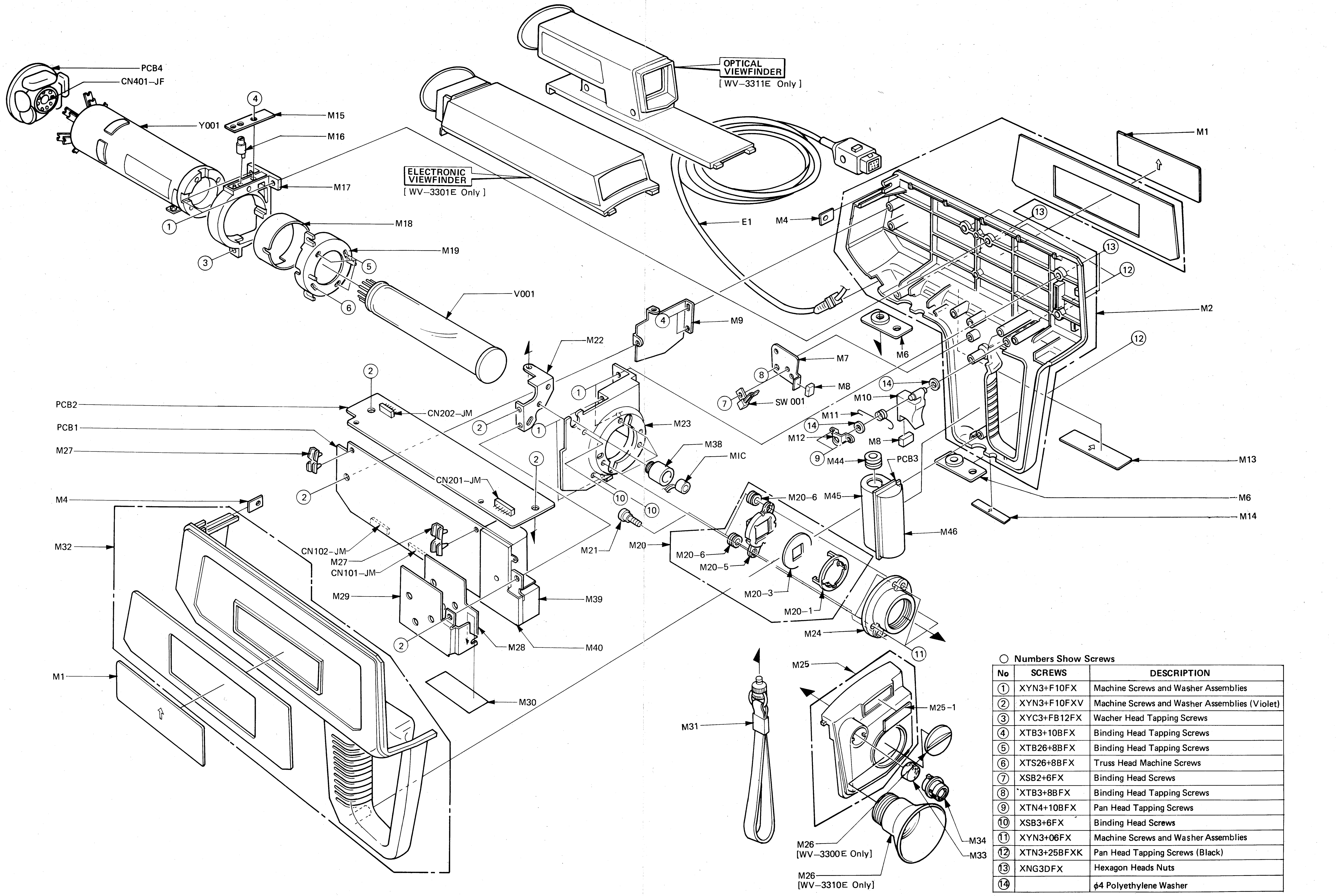
MA26W



MA150



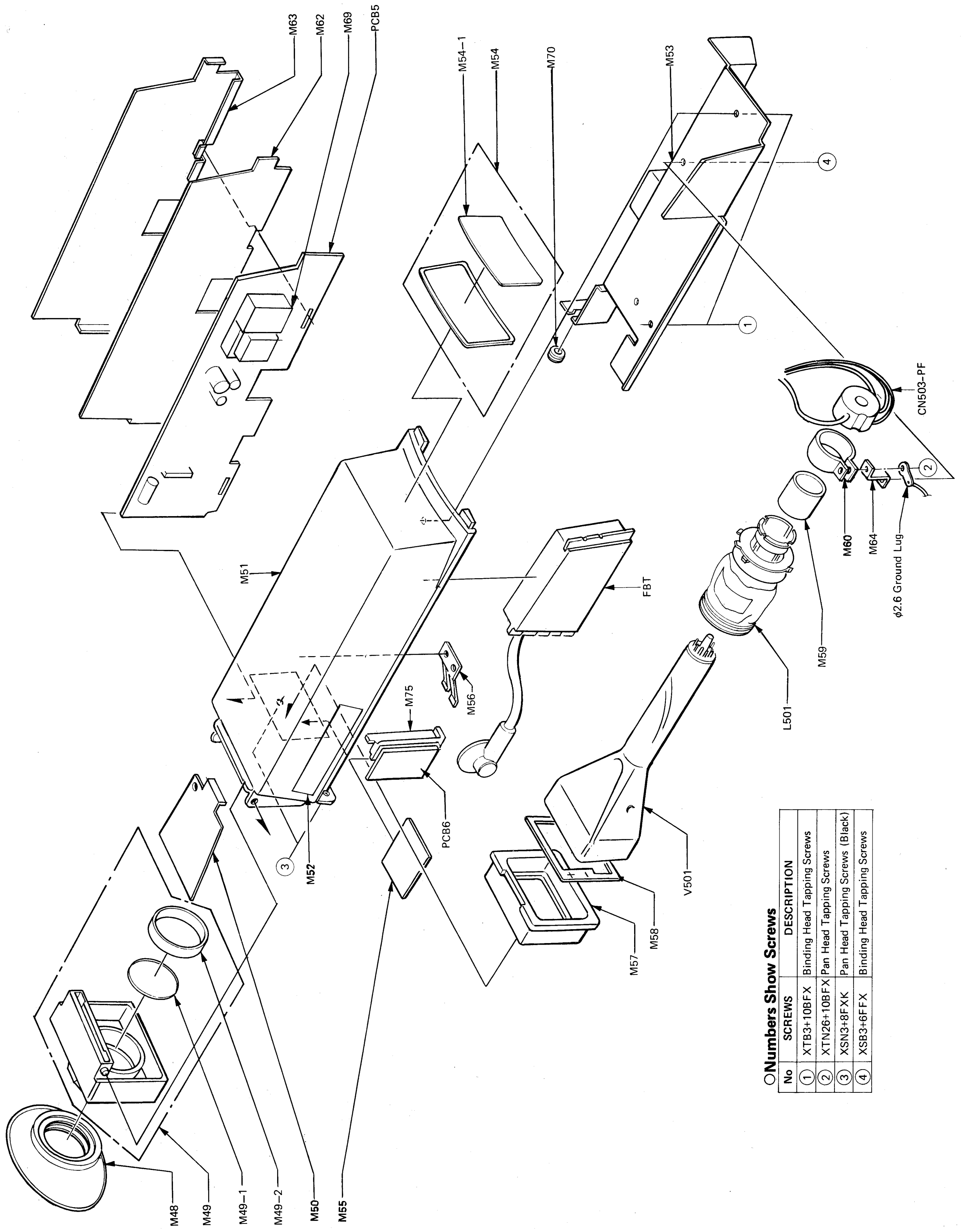
WV-3301E/3311E CAMERA HEAD EXPLODED VIEW


PCB4
CN401–JF
Y001
④
M15
M16
M17
①
③
M18
M19
⑤
⑥
V001
ELECTRONIC VIEWFINDER
[WV–3301E Only]
OPTICAL VIEWFINDER
[WV–3311E Only]
E1
M4
M1
⑬
⑬
⑫
M2
⑫
M9
④
M22
M7
⑧
M8
⑦
SW 001
M6
⑭
M10
M11
⑭
M12
M8
⑨
M44
PCB3
M13
M6
M14
②
PCB2
CN202–JM
PCB1
②
①
①
M23
M38
MIC
M27
②
CN201–JM
②
⑩
⑩
M4
M20–6
M45
M46
M32
CN102–JM
M27
CN101–JM
M21
M20
M20–6
M20–5
M20–3
M29
M39
M20–1
M24
②
M28
M40
⑪
M1
M30
M25
M25–1
M31
M34
M33
M26
[WV–3300E Only]
M26
[WV–3310E Only]

○ Numbers Show Screws

No	SCREWS	DESCRIPTION
①	XYN3+F10FX	Machine Screws and Washer Assemblies
②	XYN3+F10FXV	Machine Screws and Washer Assemblies (Violet)
③	XYC3+FB12FX	Wacher Head Tapping Screws
④	XTB3+10BFX	Binding Head Tapping Screws
⑤	XTB26+8BFX	Binding Head Tapping Screws
⑥	XTS26+8BFX	Truss Head Machine Screws
⑦	XSB2+6FX	Binding Head Screws
⑧	XTB3+8BFX	Binding Head Tapping Screws
⑨	XTN4+10BFX	Pan Head Tapping Screws
⑩	XSB3+6FX	Binding Head Screws
⑪	XYN3+06FX	Machine Screws and Washer Assemblies
⑫	XTN3+25BFXK	Pan Head Tapping Screws (Black)
⑬	XNG3DFX	Hexagon Heads Nuts
⑭		ϕ4 Polyethylene Washer

WV-3304E ELECTRONIC VIEWFINDER EXPLODED VIEW
〔WV-3301E Only〕


M63
M62
M69
PCB5
M54-1
M54
M70
M53
④
①
CN503-PF
②
M60
M64
φ2.6 Ground Lug
M59
L501
FBT
M51
M56
M75
PCB6
V501
M58
M57
③
M52
M48
M49
M49-1
M49-2
M50
M55

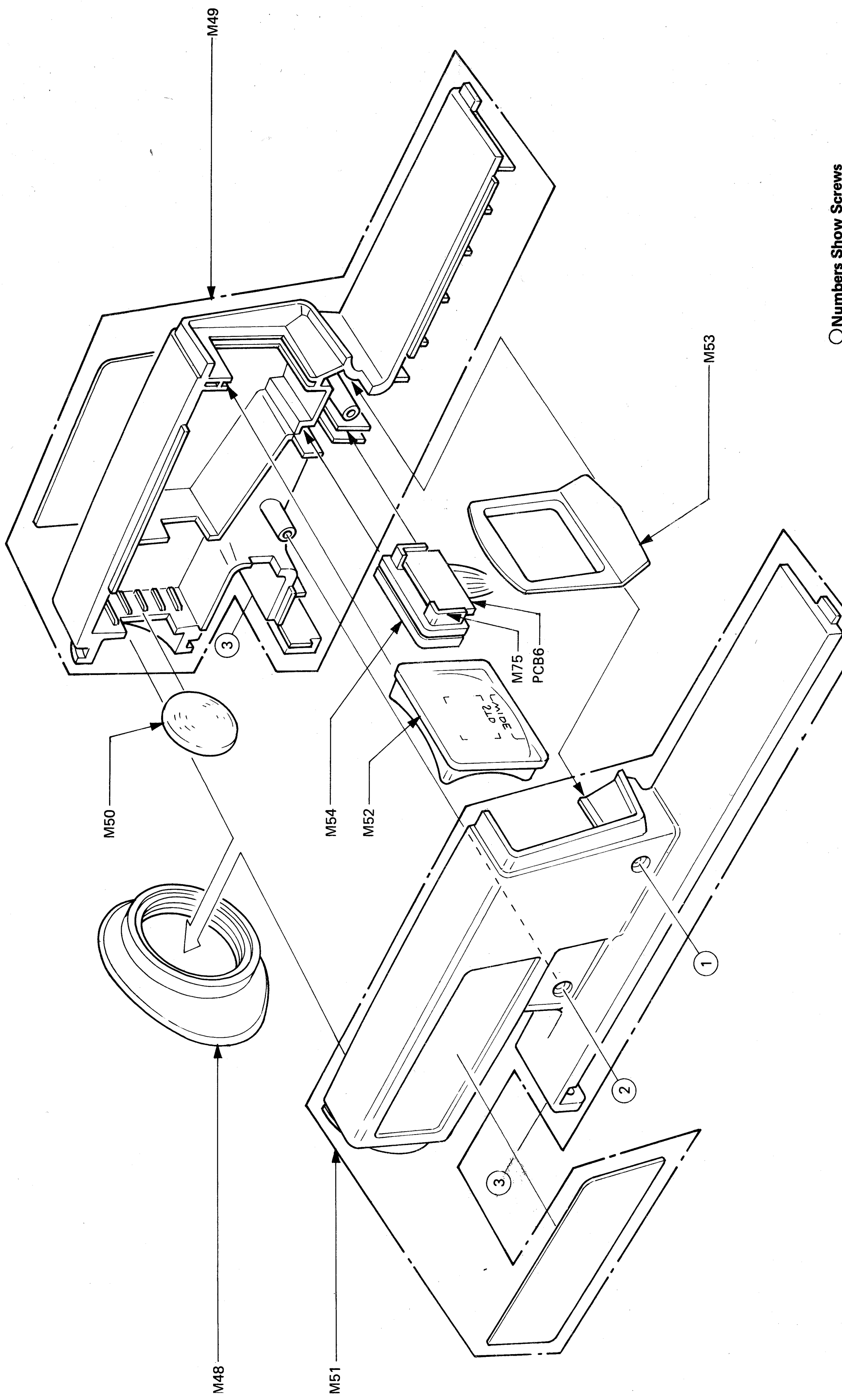
○**Numbers Show Screws**

No	SCREWS	DESCRIPTION
①	XTB3+10BFX	Binding Head Tapping Screws
②	XTN26+10BFX	Pan Head Tapping Screws
③	XSN3+8FXK	Pan Head Tapping Screws (Black)
④	XSB3+6FFX	Binding Head Tapping Screws

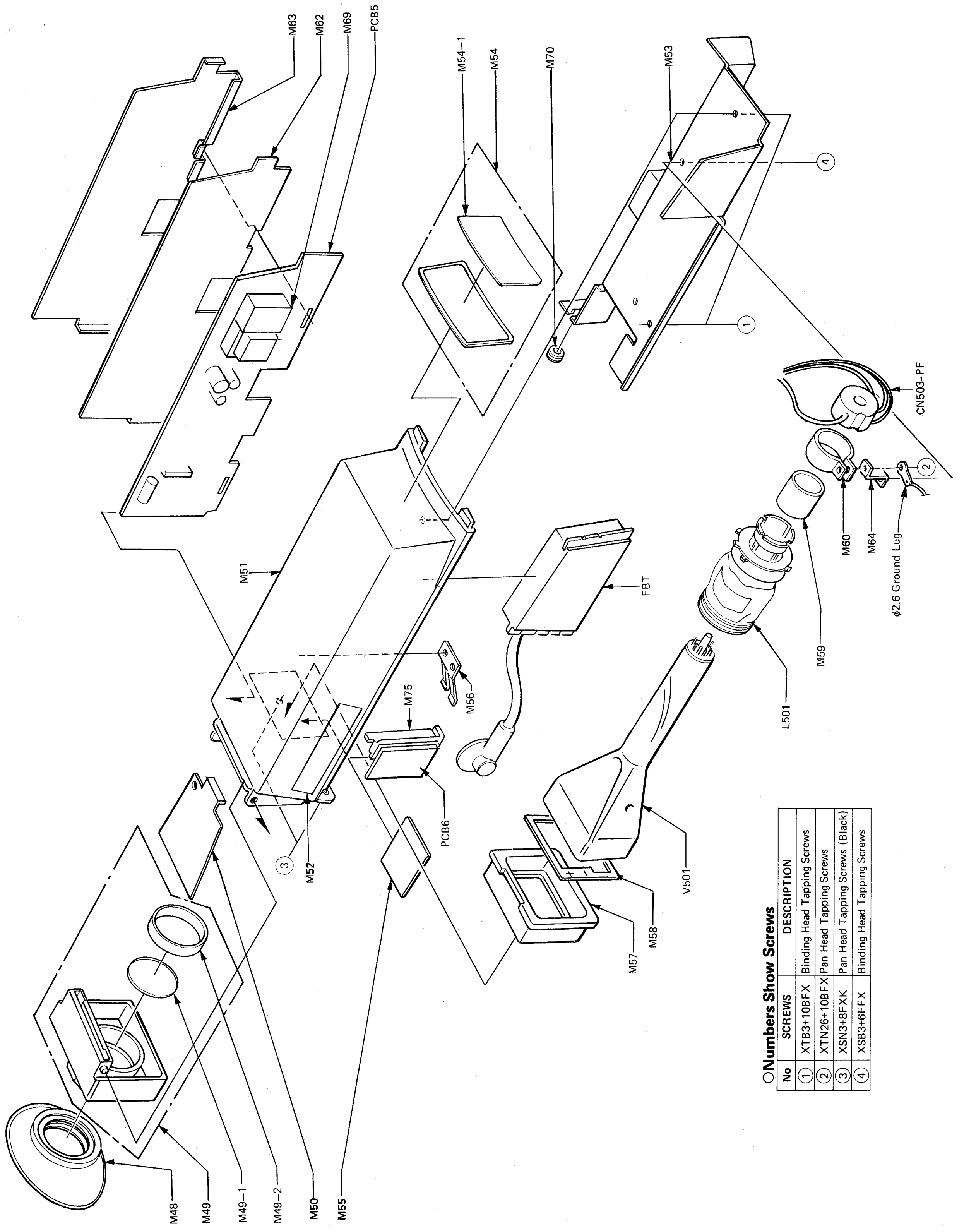
WV-3314 OPTICAL VIEWFINDER EXPLODED VIEW
〔WV-3311E Only〕

○**Numbers Show Screws**

No	SCREWS	DESCRIPTION
①	XTB3+30BFXK	Binding Head Screws
②	XTB3+25BFXK	Binding Head Tapping Screws
③	XSN3+8FXK	Binding Head Tapping Screws


M49
M53
M75
PCB6
M54
M52
M50
③
①
②
M48
M51

WV-3304E ELECTRONIC VIEWFINDER EXPLODED VIEW
〔WV-3301E Only〕


M63
M62
M69
PCB5
M54-1
M54
M70
M53
④
①
CN503-PF
②
M60
M64
ø2.6 Ground Lug
M59
L501
FBT
M51
M75
M56
PCB6
③
M52
V501
M58
M57
M48
M49
M49-1
M49-2
M50
M55

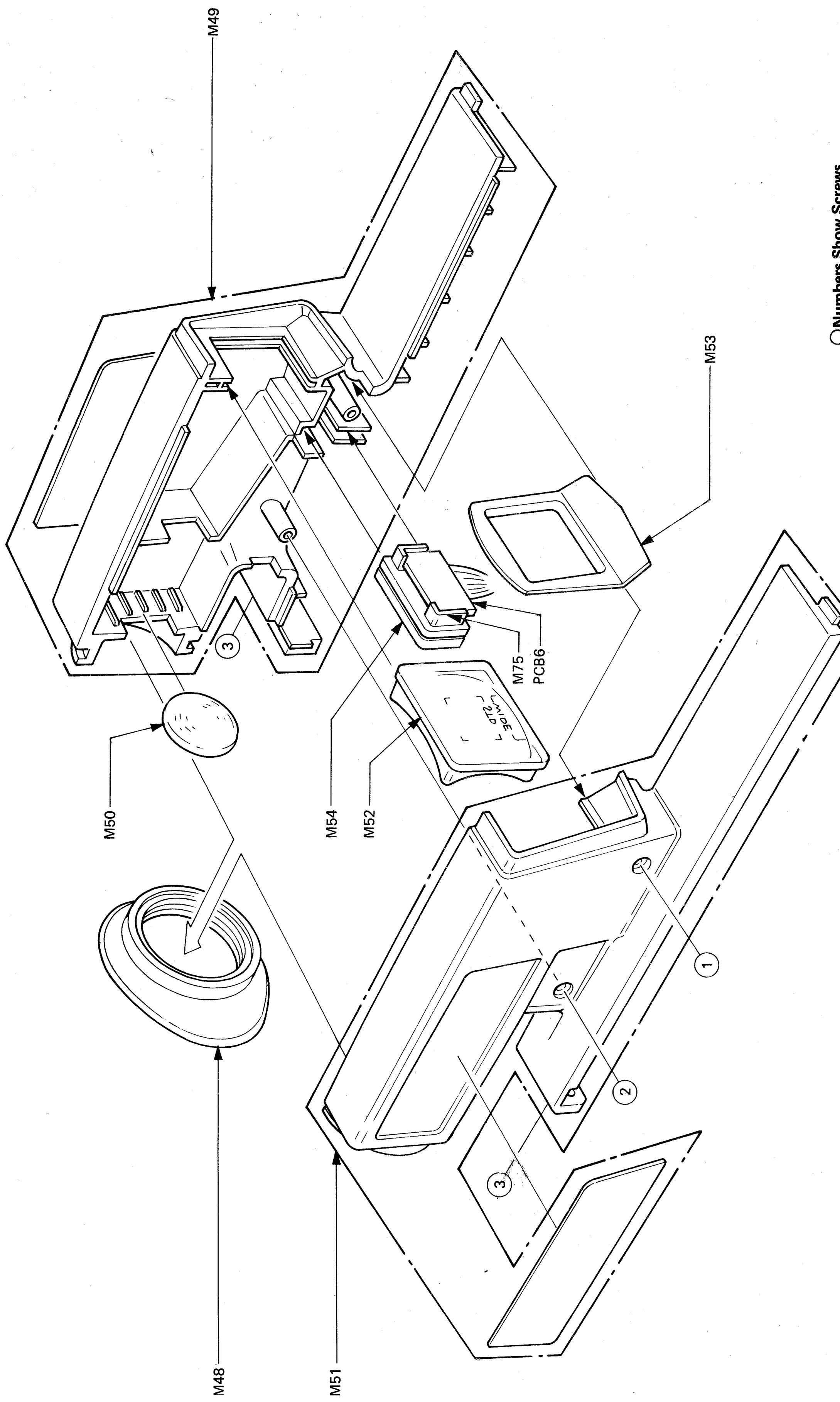
○Numbers Show Screws

No	SCREWS	DESCRIPTION
①	XTB3+10BFX	Binding Head Tapping Screws
②	XTN26+10BFX	Pan Head Tapping Screws
③	XSN3+8FXK	Pan Head Tapping Screws (Black)
④	XSB3+6FFX	Binding Head Tapping Screws

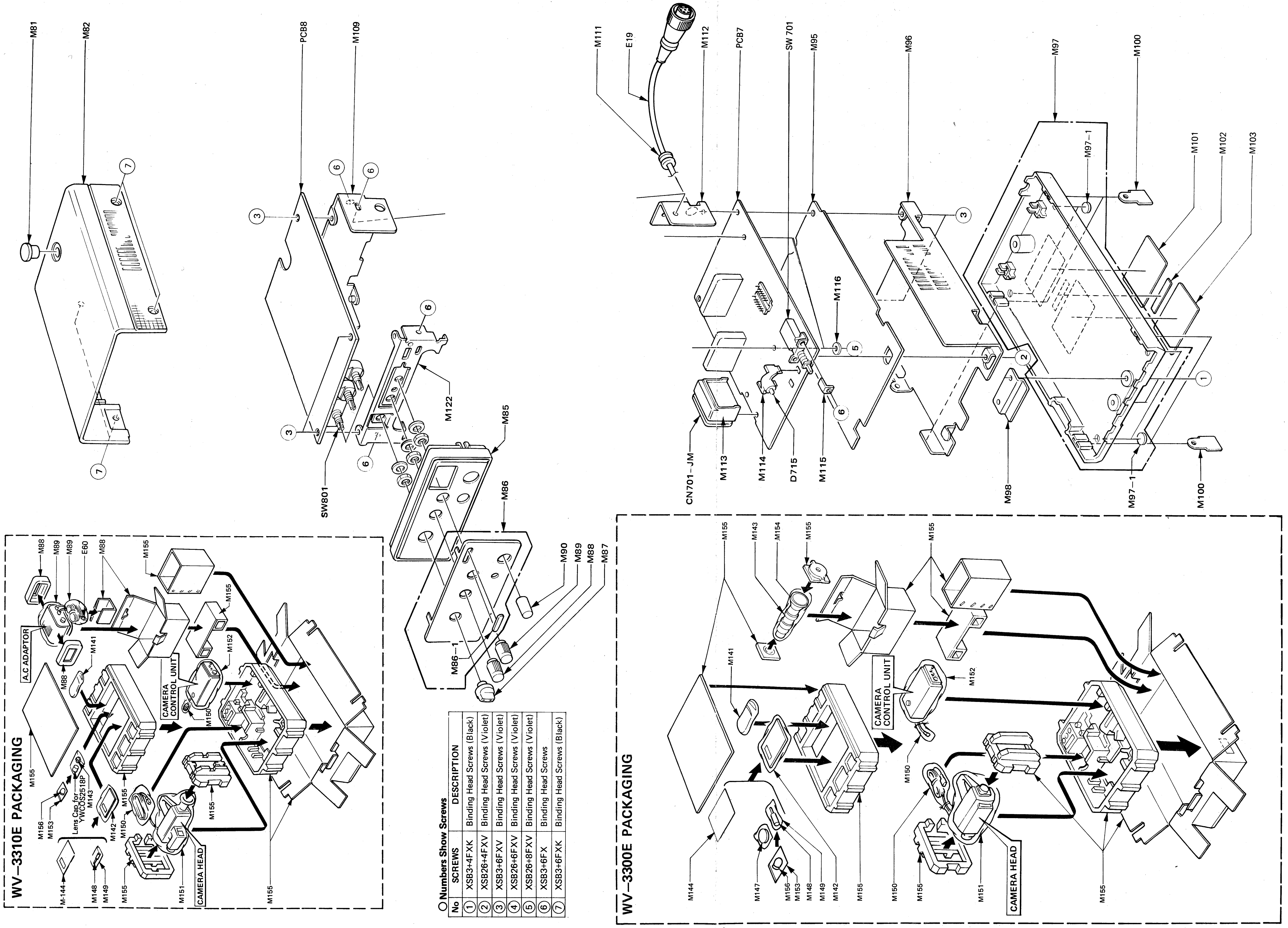
WV-3314 OPTICAL VIEWFINDER EXPLODED VIEW
〔WV-3311E Only〕

○Numbers Show Screws

No	SCREWS	DESCRIPTION
①	XTB3+30BFXK	Binding Head Screws
②	XTB3+25BFXK	Binding Head Tapping Screws
③	XSN3+8FXK	Binding Head Tapping Screws


M49
M53
M75
PCB6
M54
M52
M50
M48
M51
①
②
③

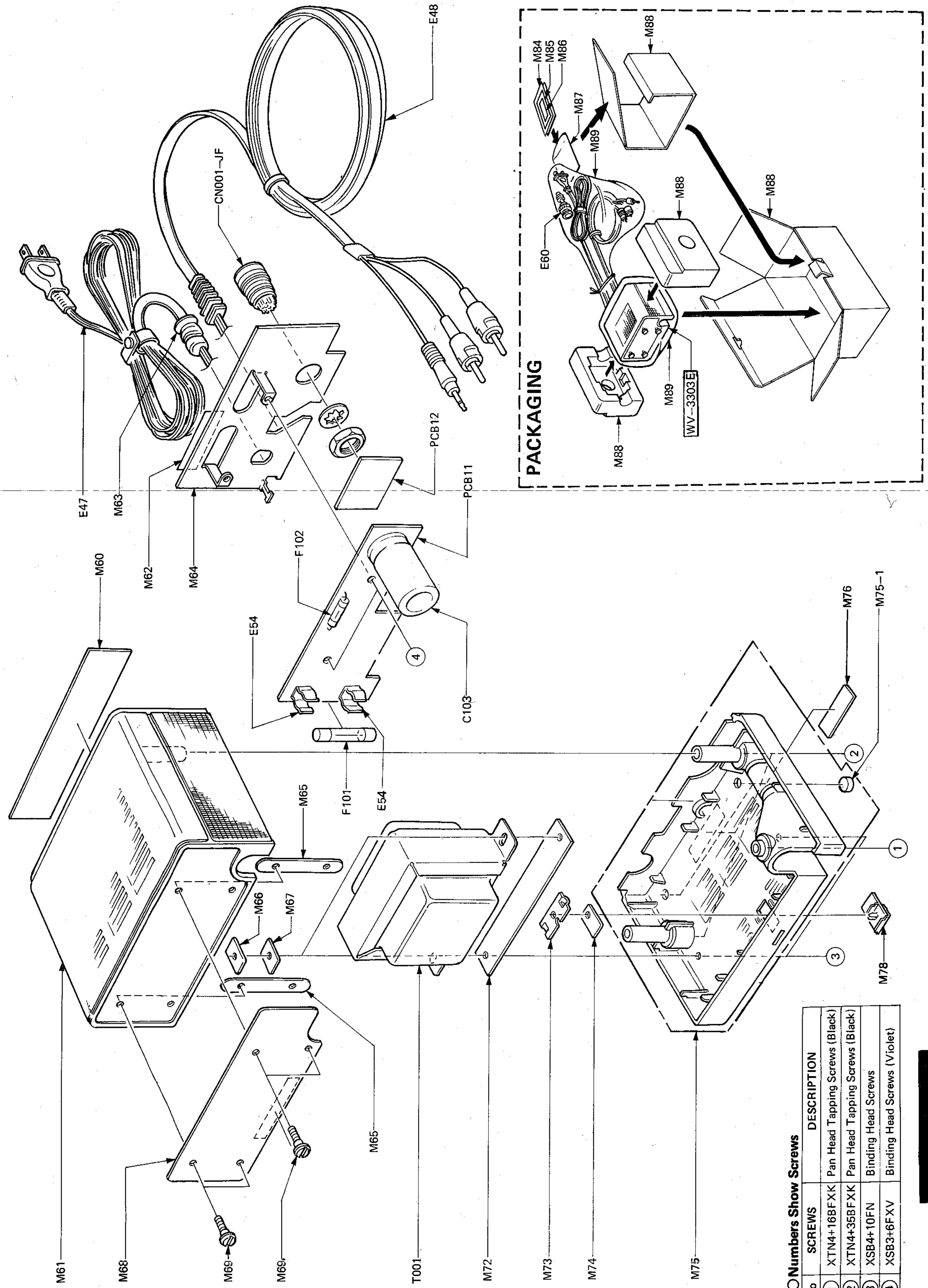
WV-3302E CAMERA CONTROL UNIT EXPLODED VIEW
WV-3300E/3310E ACCESSORY PARTS AND PACKAGING


M81
M82
⑦
⑦
PCB8
M109
③
⑥
⑥
③
⑥
⑥
SW801
M122
M85
M86
M86-1
M90
M89
M88
M87
M111
E19
M112
PCB7
SW 701
M95
M96
M97
M100
M97-1
M101
M102
M103
③
M116
⑤
②
①
⑥
CN701-JM
M113
M114
D715
M115
M98
M97-1
M100
WV-3310E PACKAGING
M88
M89
M89
E60
M88
M155
A.C ADAPTOR
M141
M88
M155
M152
CAMERA CONTROL UNIT
M150
M155
M156
M153
Lens Cap for YWCC2518P
M143
M142
M150
M155
M155
M-144
M148
M149
M155
M151
CAMERA HEAD
M155
WV-3300E PACKAGING
M155
M143
M154
M155
M155
M141
CAMERA CONTROL UNIT
M152
M150
M144
M147
M156
M153
M148
M149
M142
M155
M150
M155
M151
CAMERA HEAD
M155

○ Numbers Show Screws

No	SCREWS	DESCRIPTION
①	XSB3+4FXK	Binding Head Screws (Black)
②	XSB26+4FXV	Binding Head Screws (Violet)
③	XSB3+6FXV	Binding Head Screws (Violet)
④	XSB26+6FXV	Binding Head Screws (Violet)
⑤	XSB26+8FXV	Binding Head Screws (Violet)
⑥	XSB3+6FX	Binding Head Screws
⑦	XSB3+6FXK	Binding Head Screws (Black)

WV–3303E A.C ADAPTER EXPLODED VIEW AND PACKAGING


E48
CN001–JF
E47
M63
M62
M64
PCB12
PCB11
F102
E54
C103
④
M60
M65
F101
E54
M66
M67
M61
M68
M69
M69
T001
M72
M73
M74
M75
M65
M76
M75–1
②
①
③
M78
PACKAGING
M84
M85
M86
M87
M88
M89
E60
M88
M88
M89
WV–3303E
M88

○Numbers Show Screws

No	SCREWS	DESCRIPTION
①	XTN4+16BFXK	Pan Head Tapping Screws (Black)
②	XTN4+35BFXK	Pan Head Tapping Screws (Black)
③	XSB4+10FN	Binding Head Screws
④	XSB3+6FXV	Binding Head Screws (Violet)

Service Manual

Vol. 4

Replacement Parts List

PAL COLOUR TV CAMERAS

WV-3300E/3310E

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Important Safety Notice

Components identified by shaded area have special characteristics important for safety.When replacing any of these components, use only manufacturer's specified parts.

REPLACEMENT PARTS LIST

WV-3301E/3311E, MISCELLANEOUS, YWV3301E ZK01

CAMERA HEAD WV-3301E/3311E MISCELLANEOUS

SYMBOL NO.	PART NO.	DESCRIPTION
V001	★ S4089P	Vidicon Tube
Y001	ELY25A101B	Deflection Coil Assembly
SW001	YWBSW47P	Switch
E1	YWCABLE3301	Camera Cable Assembly
M1	YWV3301EUM1	Side Label (X2) [WV-3301 Only]
	YWV3311EUM1	Side Label (X2) [WV-3311 Only]
M2	YWV3301FKR99	Chassis Assembly
M4	YWV3301AM06	Fastening Bracket (X2)
M6	YWV3301AM02	Bracket (X2)
M7	YWV3301AM12	Fastening Bracket for Switch
M8	YWV3301WB01	Rubber Cushion (X2)
M9	YWV3301AM05	Shield Plate
M10	YWV3301ER04	REC Knob
M11	YWV3301WM01	Spring
M12	YWV3301AM04	Fastening Bracket for Knob
M13	★YWV3301EUM2A	Main Label [WV-3301E Only]
	★YWV3311EUM2A	Main Label [WV-3311E Only]
M14	YWV240PUB01D	Serial No Label
M15	YWV3301AM01	Adjusting Plate
M16	YWV3301FM05	Adjusting Pin
M17	YWV3301FR01	Coil Guide
M18	YWV3301AM13	Shield Ring
M19	YWV3301CM02C	Coil Base
M20	YWV3301FR99	Filter Assembly
(M20-1)	YWV3301FR03A	Filter Holder
(M20-3)	YWV3301FR06	Filter Spacer
(M20-5)	YWV3301FR02A	Crystal Holder
(M20-6)	YWV3301WB03	Rubber Bushing (X2)
M21	YWV3301FM02	Filter Mounting Screw (X2)
M22	YWV3301AM03	Fastening Bracket for Printed Circuit Board
M23	YWV3301CM01	Fastening Bracket for Deflection Coil
M24	YWV3301FM01B	Lens Base
M25	YWV3301KR97	Front Cover Assembly
(M25-1)	YWV3301UR01	ESD Color Mark Label
M26	YWBC-2B	Body Cap [WV-3301 Only]
	YWCOS2518P	Standard Lens [WV-3310 Only]
M27	YWV3301FR05	Hinge (X2)
M28	YWV3301LB02A	Insulator Paper A
M29	YWV3301AM07A	Shield Panel
M30	YWV3301LB01	Insulator Paper B
M31	YWH52	Hand Strap
M32	YWV3301PKR98	Case Assembly
M33	YWV3301FM04A	Mic Net
M34	★ YWV3301KR04A	Mic Cover

YWV3301EZK01 DEFLECTION CIRCUIT BOARD

SYMBOL NO.	PART NO.	DESCRIPTION
PCB1	YWV3301ZK01	Printed Circuit Board Assembly
IC101,102	YWCA3140E	Integrated Circuit
IC103	YHSNJM4558D	Integrated Circuit
IC104	DN819	Integrated Circuit
Q101	2SC828-RS	Transistor
Q102	2SA838-BC	Transistor
Q103	2SC828-ST	Transistor
Q104	2SC1047-CD	Transistor
Q105	2SA838-BC	Transistor
Q106	2SA721-TU	Transistor
Q107	2SC828-RS	Transistor
Q108	2SC1317-QR	Transistor
Q109	2SC1913A-QR	Transistor
Q110	2SC1317-QR	Transistor
Q111	2SA719-QR	Transistor
Q112	2SA721-TU	Transistor
Q113	2SC1384-RS	Transistor
Q114,115	2SA684-QR	Transistor
Q116	2SC828-RS	Transistor
Q117	YUT2SK68A-N	Field Effect Transistor
Q118	2SC1047-CD	Transistor
Q119	2SC1047-D	Transistor
Q120	2SA838-C	Transistor
Q121	2SC828-RS	Transistor
Q122	2SC1047-CD	Transistor
Q123	2SC828-RS	Transistor
Q124	2SA564-RS	Transistor
Q125	2SK68A-MN	Field Effect Transistor
Q126	2SC1327-TU	Transistor
Q127	2SA721-TU	Transistor
Q128	2SC1047-CD	Transistor
Q129	2SC1327-TU	Transistor
Q130,131	2SA838-BC	Transistor
Q132	2SC1573-QR	Transistor
Q133	2SC828-RS	Transistor
D101	MA26	Diode
D102,103	MA150	Diode
D104,105	MA26W	Diode
D106,107	MA150	Diode
D108	MA26W	Diode
D109,110	MA26	Diode
D111~ D113	MA150	Diode
D114	YUDXZ-070	Zener Diode
R101	ERD18TJ223	Carbon Film 22KΩ 1/8W
R102	ERD18TJ102	Carbon Film 1KΩ 1/8W
R103	ERO25CKF1000	Metal Film 100Ω 1/4W
R104	ERO25CKF1200	Metal Film 120Ω 1/4W
R105	ERO25CKF51R0	Metal Film 51Ω 1/4W
R106	ERO25CKF1601	Metal Film 1.6KΩ 1/4W
R107	ERO25CKF3301	Metal Film 3.3KΩ 1/4W
R108	ERD18TJ752	Carbon Film 7.5KΩ 1/8W
R109	ERD18TJ103	Carbon Film 10KΩ 1/8W
R110	ERD18TJ102	Carbon Film 1KΩ 1/8W
R111	ERD18TJ222	Carbon Film 2.2KΩ 1/8W
R112	ERD18TJ682	Carbon Film 6.8KΩ 1/8W
R113	ERD18TJ391	Carbon Film 390Ω 1/8W
R114	ERD18TJ272	Carbon Film 2.7KΩ 1/8W
R115	ERD18TJ562	Carbon Film 5.6KΩ 1/8W
R116	ERD18TJ221	Carbon Film 220Ω 1/8W
R117	ERO25CKF68RO	Metal Film 68Ω 1/4W
R118	ERD18TJ101	Carbon Film 100Ω 1/8W
R119	ERD18TJ222	Carbon Film 2.2KΩ 1/8W
R120	ERD18TJ562	Carbon Film 5.6KΩ 1/8W
R121	ERD18TJ221	Carbon Film 220Ω 1/8W

Parts indicated by (★) are used only for this Model at the time this Model is introduced.

SYMBOL NO.	PART NO.	DESCRIPTION		
R122	ERD18TJ274	Carbon Film	270KΩ	1/8W
R123	ERSB40J202	Metal Film	2KΩ	1/4W
R124	ERD18TJ152	Carbon Film	1.5KΩ	1/8W
R125	ERD18TJ562	Carbon Film	5.6KΩ	1/8W
R126,127	ERD18TJ332	Carbon Film	3.3KΩ	1/8W
R128	ERD18TJ131	Carbon Film	130Ω	1/8W
R129	ERD18TJ151	Carbon Film	150Ω	1/8W
R130	ERD18TJ392	Carbon Film	3.9KΩ	1/8W
R131	ERD18TJ183	Carbon Film	18KΩ	1/8W
R132	ERO25CKF2703	Metal Film	270KΩ	1/4W
R133	ERD18TJ562	Carbon Film	5.6KΩ	1/8W
R134	ERD18TJ222	Carbon Film	2.2KΩ	1/8W
R135	ERO25CKF33R0	Metal Film	33Ω	1/4W
R136	ERD18TJ222	Carbon Film	2.2KΩ	1/8W
R137	ERD18TJ152	Carbon Film	1.5KΩ	1/8W
R138	ERD18TJ221	Carbon Film	220Ω	1/8W
R139	ERO25CKF1002	Metal Film	10KΩ	1/4W
R140	ERO25CKF2002	Metal Film	20KΩ	1/4W
R141	ERD18TJ103	Carbon Film	10KΩ	1/8W
R142	ERD18TJ563	Carbon Film	56KΩ	1/8W
R143	ERD18TJ392	Carbon Film	3.9KΩ	1/8W
R144	ERD18TJ562	Carbon Film	5.6KΩ	1/8W
R145	ERD18TJ153	Carbon Film	15KΩ	1/8W
R146	ERD18TJ104	Carbon Film	100KΩ	1/8W
R147	ERD14FJ105	Carbon Film	1MΩ	1/4W
R148	ERD18TJ361	Carbon Film	360Ω	1/8W
R149	ERD18TJ391	Carbon Film	390Ω	1/8W
R150	ERD18TJ331	Carbon Film	330Ω	1/8W
R151	ERD18TJ152	Carbon Film	1.5KΩ	1/8W
R152	ERD18TJ182	Carbon Film	1.8KΩ	1/8W
R153,154	ERD18TJ222	Carbon Film	2.2KΩ	1/8W
R155	ERD18TJ152	Carbon Film	1.5KΩ	1/8W
R156	ERD18TJ274	Carbon Film	270KΩ	1/8W
R157	ERD18TJ272	Carbon Film	2.7KΩ	1/8W
R158	ERD18TJ391	Carbon Film	390Ω	1/8W
R159	ERD18TJ332	Carbon Film	3.3KΩ	1/8W
R160	ERD18TJ242	Carbon Film	2.4KΩ	1/8W
R161	ERD18TJ392	Carbon Film	3.9KΩ	1/8W
R162	ERD18TJ332	Carbon Film	3.3KΩ	1/8W
R163	ERD18TJ272	Carbon Film	2.7KΩ	1/8W
R164	ERD18TJ122	Carbon Film	1.2KΩ	1/8W
R165	ERD18TJ472	Carbon Film	4.7KΩ	1/8W
R167	ERD18TJ102	Carbon Film	1KΩ	1/8W
R168	ERD18TJ132	Carbon Film	1.3KΩ	1/8W
R169,170	ERD18TJ272	Carbon Film	2.7KΩ	1/8W
R171	ERD18TJ102	Carbon Film	1KΩ	1/8W
R172	ERD18TJ184	Carbon Film	180KΩ	1/8W
R173	ERD18TJ363	Carbon Film	36KΩ	1/8W
R174	ERD18TJ621	Carbon Film	620Ω	1/8W
R175	ERD18TJ393	Carbon Film	39KΩ	1/8W
R176	ERD18TJ152	Carbon Film	1.5KΩ	1/8W
R177	ERD18TJ822	Carbon Film	8.2KΩ	1/8W
R178	ERD18TJ104	Carbon Film	100KΩ	1/8W
R179,180	ERD18TJ102	Carbon Film	1KΩ	1/8W
R182	ERD18TJ473	Carbon Film	47KΩ	1/8W
R183	ERD18TJ221	Carbon Film	220Ω	1/8W
R184	ERD18TJ822	Carbon Film	8.2KΩ	1/8W

SYMBOL NO.	PART NO.	DESCRIPTION		
R185	ERD18TJ222	Carbon Film	2.2K	1/8W
BR101	EXBH89040K	Block Resistor		
BR102	EXBH87042G	Block Resistor		
BR103	EXBH89043G	Block Resistor		
VR101	YWCR19R100B	Variable Resistor		
VR102	EVNK4AA00B14	Variable Resistor		
VR103	EVNK4AA00B24	Variable Resistor		
VR104	EVNK0AA00B15	Variable Resistor		
VR105,106	EVNK0AA00B23	Variable Resistor		
VR107	EVNK0AA00B13	Variable Resistor		
VR108	EVNK0AA00B55	Variable Resistor		
VR109	EVNK0AA00B25	Variable Resistor		
C101	ECEA1CS100	Electrolytic	10μF	16V
C102	ECQM1H273KZ	Polyester	0.027μF	50V
C103	ECEA50N1	Electrolytic	1μF	50V
C104	ECEA0JS101	Electrolytic	100μF	6.3V
C105	ECEA1CS100	Electrolytic	10μF	16V
C106	ECQM1H333KZ	Polyester	0.033μF	50V
C107	ECEA1HS010	Electrolytic	1μF	50V
C108	ECKD1H151KB	Ceramic	150pF	50V
C109	ECEA1CS100	Electrolytic	10μF	16V
C110	ECSZ10EF47Q	Tantalum	47μF	10V
C111	ECQM1H472KZ	Polyester	0.0047μF	50V
C112	ECEA1CS100	Electrolytic	10μF	16V
C113	ECSF10E68	Tantalum	68μF	10V
C114	ECQS1181JZ	Styrol	180pF	125V
C115	ECQS1391JZ	Styrol	390pF	125V
C116	ECEA1CS100	Electrolytic	10μF	16V
C117	ECQM1H104KZ	Polyester	0.1μF	50V
C118	YCAWS224J	Polypropylene	0.22μF	
C119	ECEA1AS470	Electrolytic	47μF	10V
C120	ECEA0JS101	Electrolytic	100μF	6.3V
C121	ECEA1AS470	Electrolytic	47μF	10V
C122	ECEA1CS100	Electrolytic	10μF	16V
C123	ECSZ10EF2R2Q	Tantalum	2.2μF	10V
C124	ECEA1ES4R7	Electrolytic	4.7μF	25V
C125	ECEA2ASR47	Electrolytic	0.47μF	100V
C126	YCQMS10104K	Polyester	0.1μF	100V
C127,128	ECEA0JS470	Electrolytic	47μF	6.3V
C129	ECQM1H153KZ	Polyester	0.015μF	50V
C130	ECSZ6EF47Q	Tantalum	47μF	6.3V
C131	ECSZ10EF47Q	Tantalum	47μF	10V
C132	ECCD1H080DC	Ceramic	8pF	50V
C133	ECSZ10EF4R7Q	Tantalum	4.7μF	10V
C134	ECEA0JS221	Electrolytic	220μF	6.3V
C135	ECSZ10EF47Q	Tantalum	47μF	10V
C136	ECEA1CS100	Electrolytic	10μF	16V
C137,138	ECSZ10EF1Q	Tantalum	1μF	10V
C139	ECEA1AS470	Electrolytic	47μF	10V
C140	ECEA0JS470	Electrolytic	47μF	6.3V
C141	ECCD1H180JC	Ceramic	18pF	50V
C142	ECCD1H080DR	Ceramic	8pF	50V
C143	ECEA1ES470	Electrolytic	47μF	25V
C144	ECCD1H680JC	Ceramic	68pF	50V
C145	ECEA2ASR47	Electrolytic	0.47μF	100V
C146,147	ECEA1CS100	Electrolytic	10μF	16V
C148	ECEA1AS470	Electrolytic	47μF	10V

SYMBOL NO.	PART NO.	DESCRIPTION		
C149	ECEA2AS010	Electrolytic	1μF	100V
VC101	ECV1ZW30X44	Trimmer Capacitor	30pF	
L101	YWL10103J	Inductance	10mH	
L102	ELQ333D008J	Inductance	33mH	
L103	YWPRE161J	Inductance	160μH	
L104	YWLS-7101J	Inductance	100μH	
L105	YWLS-151J	Inductance	150μH	
L106	ELQ391D012K	Inductance	390μH	
TP101~TP103	YWV1000ABM9	Test Point Pin (X3)		
CN101-JM	EMCS0950	9-Pin Jack-Male		
CN102-JM	EMCS0750	7-Pin Jack-Male		
M38	YWV3301FB02	Mic Holder		
M39	YWV3301AM08	Shield Cover A		
M40	YWV3301AM09	Shield Cover B		

YWV3301ZK02 SHADING CIRCUIT BOARD

SYMBOL NO.	PART NO.	DESCRIPTION		
PCB2	YWV3301ZK02	Printed Circuit Board Assembly		
IC201	YWNJM2901N	Integrated Circuit		
Q201	2SC1327-TU	Transistor		
Q202	2SC828-RS	Transistor		
Q203~Q205	2SC828-QR	Transistor		
Q206	2SC1317-QR	Transistor		
Q207	2SC828-QR	Transistor		
Q208	2SC1573-QR	Transistor		
Q209	2SA564A-QR	Transistor		
Q210	2SC1573-QR	Transistor		
Q211	2SA564A-QR	Transistor		
Q212	2SA721-TU	Transistor		
Q213	2SC828-RS	Transistor		
Q214	2SC828-QR	Transistor		
Q215	2SA1061-P	Transistor		
Q216	2SA564A-QR	Transistor		
Q217	2SA721-TU	Transistor		
D201~D204	MA150	Diode		
D205	YUDYZ062E	Zener Diode		
D206	YUDXZ068	Zener Diode		
R201	ERD18TJ222	Carbon Film	2.2KΩ	1/8W
R202	ERD18TJ561	Carbon Film	560Ω	1/8W
R203	ERD18TJ124	Carbon Film	120KΩ	1/8W
R204	ERD18TJ563	Carbon Film	56KΩ	1/8W
R205	ERD18TJ102	Carbon Film	1KΩ	1/8W
R206	ERD18TJ181	Carbon Film	180Ω	1/8W
R207	ERD18TJ101	Carbon Film	100Ω	1/8W
R208	ERD18TJ153	Carbon Film	15KΩ	1/8W
R209	ERD18TJ222	Carbon Film	2.2KΩ	1/8W
R210	ERD18TJ562	Carbon Film	5.6KΩ	1/8W
R211	ERD18TJ561	Carbon Film	560Ω	1/8W
R212	ERD18TJ102	Carbon Film	1KΩ	1/8W
R213,214	ERD18TJ332	Carbon Film	3.3KΩ	1/8W
R215	ERD18TJ562	Carbon Film	5.6KΩ	1/8W
R216	ERD18TJ561	Carbon Film	560Ω	1/8W
R217	ERD18TJ101	Carbon Film	100Ω	1/8W
R218	ERD18TJ332	Carbon Film	3.3KΩ	1/8W
R219	ERD18TJ562	Carbon Film	5.6KΩ	1/8W
R220	ERO25CKF7500	Metal Film	750Ω	1/4W
R221	ERD18TJ101	Carbon Film	100Ω	1/8W
R222	ERD18TJ181	Carbon Film	180Ω	1/8W
R223	ERD18TJ121	Carbon Film	120Ω	1/8W
R224	ERO25CKF5101	Metal Film	5.1KΩ	1/4W
R225	ERD18TJ333	Carbon Film	33KΩ	1/8W
R226~R228	ERD18TJ151	Carbon Film	150Ω	1/8W
R229	ERD18TJ272	Carbon Film	2.7KΩ	1/8W
R230	ERD18TJ472	Carbon Film	4.7KΩ	1/8W
R231	ERD18TJ153	Carbon Film	15KΩ	1/8W
R232	ERD18TJ561	Carbon Film	560Ω	1/8W
R233	ERD18TJ272	Carbon Film	2.7KΩ	1/8W
R234	ERD18TJ822	Carbon Film	8.2KΩ	1/8W
R235	ERD18TJ103	Carbon Film	10KΩ	1/8W
R236	ERD18TJ333	Carbon Film	33KΩ	1/8W
R237	ERD18TJ822	Carbon Film	8.2KΩ	1/8W
R238	ERD18TJ513	Carbon Film	51KΩ	1/8W
R239	ERD18TJ512	Carbon Film	5.1KΩ	1/8W
R240	ERD18TJ822	Carbon Film	8.2KΩ	1/8W
R241	ERD18TJ103	Carbon Film	10KΩ	1/8W
R242,243	ERD18TJ393	Carbon Film	39KΩ	1/8W
R244	ERD18TJ683	Carbon Film	68KΩ	1/8W
R245	ERO25CKF2201	Metal Film	2.2KΩ	1/4W
R246	ERO25CKF8201	Metal Film	8.2KΩ	1/4W
R247	ERD18TJ562	Carbon Film	5.6KΩ	1/8W
R248	ERD18TJ102	Carbon Film	1KΩ	1/8W
R249	ERD18TJ103	Carbon Film	10KΩ	1/8W
R250	ERD18TJ471	Carbon Film	470Ω	1/8W
BR201	EXBH811041J	Block Resistor		
VR201~VR203	EVNK0AA00B53	Variable Resistor		
VR204	EVNK0AA00B54	Variable Resistor		
VR205,206	EVNK0AA00B53	Variable Resistor		
VR207	EVNK0AA00B13	Variable Resistor		
C201	ECEA1AS101	Electrolytic	100μF	10V
C202	ECSZ35EFR1Q	Tantalum	0.1μF	35V
C203	ECQM1H222KZ	Polyester	0.0022μF	50V
C204	ECEA1AS221	Electrolytic	220μF	10V
C205	ECEA50N1	Electrolytic	1μF	50V
C206	ECEA1CS100	Electrolytic	10μF	16V
C207,208	ECEA1HSR47	Electrolytic	0.47μF	50V
C209	ECEA1CS100	Electrolytic	10μF	16V
C210	ECEA1HSR47	Electrolytic	0.47μF	50V
C211	ECEA1AS221	Electrolytic	220μF	10V
C212	ECEA1CS100	Electrolytic	10μF	16V
C213	ECQM1H273KZ	Poyester	0.027μF	50V
C214	ECQM1H222KZ	Polyester	0.0022μF	50V
C215,216	ECEA1CS100	Electrolytic	10μF	16V
C217	ECEA1HS010	Electrolytic	1μF	50V
C218	ECEA1ES100	Electrolytic	10μF	25V
C219	ECEA1CS100	Electrolytic	10μF	16V
C220	ECQM1H223KZ	Polyester	0.022μF	50V
C221	ECEA1ES100	Electrolytic	10μF	25V
C222	ECEA1HS100	Electrolytic	10μF	50V
C223	ECKD1H121KB	Ceramic	120pF	50V
C224	ECEA1CS331	Electrolytic	330μF	16V
C225	ECEA1CS330	Electrolytic	33μF	16V

SYMBOL NO.	PART NO.	DESCRIPTION
C226	ECEA0JS470	Electrolytic 47μF 6.3V
C227,228	ECSF35ER68	Tantalum 0.68μF 35V
MIC	WM034Z124	Electret Capacitor Microphone Unit
E6	YW2810P2025	Jumper Cable (X2)
TP201～TP205	YWV1000ABM9	Test Point Pin (X5)
CN201-JM	EMCS0550L	5-Pin Jack-Male
CN202-JM	EMCS0650L	6-Pin Jack-Male

YWV3301ZK03
HIGH VOLTAGE CIRCUIT BOARD

SYMBOL NO.	PART NO.	DESCRIPTION
PCB3	YWV3301ZK03	Printed Circuit Board Assembly
Q301	2SA684-RS	Transistor
Q302	2SC1384-RS	Transistor
D301,302	YUDSIR150	Diode
D303,304	YUDSIR60	Diode
D305,306	YUDERB12-02	Diode
R301	ERD18TJ332	Carbon Film 3.3KΩ 1/8W
R302	ERD18TJ102	Carbon Film 1KΩ 1/8W
R303	ERD18TJ561	Carbon Film 560Ω 1/8W
C301	ECEA1AS221	Electrolytic 220μF 10V
C302	ECEA250V1	Electrolytic 1μF 250V
C303	ECKD3D821KB	Ceramic 820μF 2KV
C304	ECEA450V1U	Electrolytic 1μF 450V
C305	ECEA2AS010	Electrolytic 1μF 100V
C306	ECEA2AS100	Electrolytic 10μF 100V
C307	ECKD3D821KB	Ceramic 820pF 2KV
T301	YWN227Z20PT	DC-DC Convertor Transformer
M44	YWNG-79-C	Cord Bushing
M45	YWV3301AM10	Shield Case A
M46	YWV3301AM11A	Shield Case B

YWV3301ZK04
VIDICON TUBE SOCKET CIRCUIT BOARD

SYMBOL NO.	PART NO.	DESCRIPTION
PCB4	YWV3301ZK04	Printed Circuit Board Assembly
R401	ERD18TJ105	Ceramic Filter 1MΩ 1/8W
R402	ERD18TJ334	Ceramic Filter 330KΩ 1/8W
R403	ERD18TJ104	Ceramic Filter 100KΩ 1/8W
BR401	EXBH84018M	Block Resistor
VR401	YWSR29R1MB	Variable Resistor
C401,402	ECKD3D182KB	Ceramic 1800pF 2KV
C403	ECQM4103KZ	Polyester 0.01μF 400V
C404	ECQH10103KZ	Polyester 0.01μF 1KV
C405	ECQM4473KZ	Polyester 0.047μF 400V
C406	ECWH10H103KD	Polypropylene 0.01μF 1.6KV
CN401-JF	YWS8610B30	Vidicon Tube Socket

ELECTRONIC VIEWFINDER
WV-3304E [WV-3301E Only]
MISCELLANEOUS

SYMBOL NO.	PART NO.	DESCRIPTION
V501	40CB4	B/W Picture Tube
L501	YWTLY3304	Deflection Coil
E502	YWMPU3304	Multiplier
M48	YWV3304KB01B	Rubber Hood
M49	YWV3304KR97	Support Bracket for Hood Assembly
(M49-1)	YWV3082LENS	Lens
(M49-2)	YWV2200FR01	Lens Lock Ring
M50	YWV3304WM01A	Plate Spring
M51	YWV3304PRK1A	Chassis
M52	YWS-RB019B	X-Ray Label
M53	YWV3304AM02B	Shield Cover
M54	YWV3304KR99	Front Panel Assembly
(M54-1)	YWV3304PDM1	Panasonic Label
M55	YWS-XULRB01	Caution Label
M56	YWV3304WM02	Ground Spring
M57	YWV3304WB01A	Rubber Holder
M58	YWV3304UB01A	Indication Label
M59	YWV2200WB02	Rubber Ring
M60	YWV3304AM01	Support Bracket for B/W Picture
M62	YWV3304LB01	Insulation Paper
M63	YWV3304AM04A	Shield Plate
M64	YWV3304AM05	Fastening Bracket for Shield Cover

YWV3304EZK05 [WV-3301E Only]
VIEWFINDER CIRCUIT BOARD

SYMBOL NO.	PART NO.	DESCRIPTION
PCB5	YWV3304ZK05	Printed Circuit Board Assembly
IC501	YWNJM555D	Integrated Circuit
IC502	AN374P	Integrated Circuit
Q501～Q503	2SA564-RS	Transistor
Q504	2SC828-RS	Transistor
Q505	2SA564-RS	Transistor
Q506	2SC1567-QR	Transistor
Q507	3SF11-Q	Thyristor
Q508	2SC828-RS	Transistor
Q509	2SC1047-CD	Transistor
Q510	2SC1566	Transistor
D501,502	MA150	Diode
D503	YUDERB24-04C	Diode
D504	YWRA-1Z	Diode
D505	YUDEQB01-50B	Zener Diode
D506	YUDZ345	Zener Diode
D507	MA150	Diode
D508	YUDXZ-062	Zener Diode
D509	YWRA-1Z	Diode
R501	ERD18TJ562	Carbon Film 5.6KΩ 1/8W
R502	ERD18TJ153	Carbon Film 15KΩ 1/8W
R503	ERD18TJ222	Carbon Film 2.2KΩ 1/8W
R504,505	ERD18TJ153	Carbon Film 15KΩ 1/8W
R506,507	ERD18TJ681	Carbon Filter 680Ω 1/8W
R508	ERD18TJ183	Carbon Film 18KΩ 1/8W
R509	ERD18TJ123	Carbon Film 12KΩ 1/8W
R510,511	ERD18TJ223	Carbon Film 22KΩ 1/8W
R512	ERD18TJ682	Carbon Film 6.8KΩ 1/8W
R513	ERD18TJ113	Carbon Film 11KΩ 1/8W
R514	ERD18TJ162	Carbon Film 1.6KΩ 1/8W
R515	ERD18TJ822	Carbon Film 8.2KΩ 1/8W
R516	ERD18TJ332	Carbon Film 3.3KΩ 1/8W
R517	ERD18TJ223	Carbon Film 22KΩ 1/8W
R518	ERD18TJ560	Carbon Film 56Ω 1/8W
R519	ERD18TJ152	Carbon Film 1.5KΩ 1/8W

SYMBOL NO.	PART NO.	DESCRIPTION		
R520,521	ERD25FJ225	Carbon Film	2.2MΩ	1/4W
R522	ERD18TJ105	Carbon Film	1MΩ	1/8W
R523	ERD25FJ225	Carbon Film	2.2MΩ	1/4W
R524	ERD18TJ474	Carbon Film	470KΩ	1/8W
R525	ERD25FJ125	Carbon Film	1.2MΩ	1/4W
R526	ERD18TJ333	Carbon Film	33KΩ	1/8W
R527	ERD18TJ104	Carbon Film	100KΩ	1/8W
R528	ERD18TJ153	Carbon Film	15KΩ	1/8W
R529	ERD18TJ512	Carbon Film	5.1KΩ	1/8W
R530	ERD18TJ203	Carbon Film	20KΩ	1/8W
R531	ERD18TJ393	Carbon Film	39KΩ	1/8W
R532	ERD18TJ183	Carbon Film	18KΩ	1/8W
R533	ERD18TJ102	Carbon Film	1KΩ	1/8W
R534	ERD18TJ103	Carbon Film	10KΩ	1/8W
R535	ERD18TJ223	Carbon Film	22KΩ	1/8W
R536	ERD25FJ2R2	Carbon Film	2.2Ω	1/4W
R537	ERD18TJ272	Carbon Film	2.7KΩ	1/8W
R538	ERD18TJ682	Carbon Film	6.8KΩ	1/8W
R539	ERD18TJ821	Carbon Film	820Ω	1/8W
R540	ERD18TJ223	Carbon Film	22KΩ	1/8W
R541	ERD18TJ682	Carbon Film	6.8KΩ	1/8W
R542	ERD18TJ102	Carbon Film	1KΩ	1/8W
R543	ERD18TJ331	Carbon Film	330Ω	1/8W
R544	ERD18TJ470	Carbon Filter	47Ω	1/8W
R545	ERD18TJ822	Carbon Film	8.2KΩ	1/8W
R546	ERD18TJ122	Carbon Film	1.2KΩ	1/8W
R547	ERD18TJ102	Carbon Film	1KΩ	1/8W
R548	ERD18TJ221	Carbon Film	220Ω	1/8W
R549	ERD18TJ474	Carbon Film	470KΩ	1/8W
R550	ERD18TJ563	Carbon Film	56KΩ	1/8W
VR501	EVNK0AA00B14	Variable Resistor		
VR502	YWCR29R2R2MB	Variable Resistor		
VR503	YWSR29R220KB	Variable Resistor		
VR504	EVNK0AA00B32	Variable Resistor		
VR505	EVNK0AA00B23	Variable Resistor		
C501	ECEA1AS470	Electrolytic	47μF	10V
C502	ECQS1102JZ	Styrol	1000pF	125V
C503,504	ECQM1H103KZ	Polyester	0.01μF	50V
C505	ECEA1HS010	Electrolytic	1μF	50V
C506	ECQM1H822KZ	Polyester	0.0082μF	50V
C507	ECSZ10EF2R2Q	Tantalum	2.2μF	10V
C508	ECQM1H103JZ	Polyester	0.01μF	50V
C509	ECEB1AS221	Electrolytic	220μF	10V
C510	ECQM1H223JZ	Polyester	0.022μF	50V
C511	ECEA1HSR47	Electrolytic	0.47μF	50V
C512	ECQM1H273KZ	Polyester	0.0027μF	50V
C513	ECEA1AS221	Electrolytic	220μF	10V
C514	ECQM1822JZ	Polyester	0.0082μF	100V
C515	ECEA1CS470	Electrolytic	47μF	16V
C516	ECKD3D152KB	Ceramic	1500pF	2KV
C517,518	ECKD3A102KB	Ceramic	1000pF	1KV
C519	ECEA2AS010	Electrolytic	1μF	100V
C520	ECEA1AS221	Electrolytic	220μF	10V
C521	ECQM1H103KZ	Polyester	0.01μF	50V
C522	ECEA50MR22	Electrolytic	0.22μF	50V
C523	ECSF10E2R2K	Tantalum	2.2μF	10V
C524	ECEA1CS100	Electrolytic	10μF	16V

SYMBOL NO.	PART NO.	DESCRIPTION		
C525	ECEA0JS471	Electrolytic	470μF	6.3V
C526	ECQM1H103KZ	Polyester	0.01μF	50V
C527	ECEA50MR22	Electrolytic	0.22μF	50V
C528	ECEA1AS470	Electrolytic	47μF	10V
C529	ECEA0JS221	Electrolytic	220μF	6.3V
C530	ECKD1H271KB	Ceramic	270pF	50V
C531,532	ECEA0JS101	Electrolytic	100μF	6.3V
C533	ECEA2AS100	Electrolytic	10μF	100V
C534	ECEA160V1U	Electrolytic	1μF	160V
L502	YWEL1214101K	Inductance	100μH	
L503	YWHL3304C	Coil		
L504	YWLS-7101J	Inductance	100μH	
L505	YWLS-7271J	Inductance	270μH	
L506	YWEL0610101J	Inductance	100μH	
L507	ELQ333D008J	Inductance	33mH	
T501	YWFBT3304	Fly-back Transformer		
E12	YWMT4X1R2X5	Porcelain Tube		
E13	EMCKNR02D	Plug-Female Pin (X6)		
CN501-PF	EMCB0618A52	6-Pin Plug-Female		
CN502-JM	EMCS0450	4-Pin Jack-Male		
CN503-PF	YWS7-506P-14	Picture Tube Socket		
M69	YWV3304AM03	Shield Cover		
M70	YWBSB-1SA	Cord Bushing		

YWV3304ZK06 [WV-3301E Only] INDICATION CIRCUIT BOARD

SYMBOL NO.	PART NO.	DESCRIPTION
PCB6	YWV3304ZK06	Printed Circuit Board Assembly
D601	LN23SRP	Light Emitting Diode
D602	LN43SYP	Light Emitting Diode
D603	LN33SGP	Light Emitting Diode
D604	LN43SYP	Light Emitting Diode
E13	EMCKNR02D	Plug-Female Pin (X5)
CN201-PF	EMCB0526A52	5-Pin Plug-Female
M75	YWV3304KR03A	Fastening Bracket for Printed Circuit Board

OPTICAL VIEWFINDER WV-3314 [WV-3311E Only] MISCELLANEOUS

SYMBOL NO.	PART NO.	DESCRIPTION
M48	YWV3304KB01B	Rubber Hood
M49	YWV3314PKR98	Cover (Left)
M50	YWV470-LR02A	Eyepiece Lens
M51	YWV3314PKR99	Cover (Right)
M52	YWV470-LR01	Object Lens
M53	YWV3314PUM1	Decoration Panel
M54	YWV3314KR04	Light Emitting Diode Holder

YWV3314ZK06 [WV-3311E Only] INDICATION CIRCUIT BOARD

SYMBOL NO.	PART NO.	DESCRIPTION
PCB6	YWV3314ZK06	Printed Circuit Board Assembly
D601	LN23SRP	Light Emitting Diode
D602	LN43SYP	Light Emitting Diode
D603	LN33SGP	Light Emitting Diode
D604	LN43SYP	Light Emitting Diode
E13	EMCKNR02D	Plug-Female Pin
CN201-PF	EMCB0526A52	5-Pin Plug-Female
M75	YWV3314KR03	Fastening Bracket for Printed Circuit Board

CAMERA CONTROL UNIT WV-3302E MISCELLANEOUS

SYM-BOL NO.	PART NO.	DESCRIPTION
E19	YW10GCABLE	10G Cable Assembly
M81	YWV3302HB01	Rubber Cap
M82	YWV3302KR02	Upper Cover
M85	YWV3302KR01A	Front Cover
M86	YWV3302EUM99	Decoration Panel
(M86-1)	YWV3302UR01	ESD Color Mark Label
M87	YWV3302HR01	Knob A
M88	YWV3302HR02	Knob B
M89	YWV3302HR03	Knob C
M90	YWV3302HR04	Knob D
M95	YWV3302LB01	Insulator Paper B
M96	YWV3302AM03	Shield Cover C
M97	YWV3302KR99	Lower Cover Assembly
(M97-1)	YWV3303WB01	Rubber Foot (x4)
M98	YWV3302AM01A	Fastening Bracket for V.T.R.
M100	YWV3032LM01	Fastening Bracket for Upper Cover (X4)
M101	YWV3302PUB1	Caution Label A
M102	YWS-EJARB07	Serial No. Label
M103	YWV3302PUM1A	Main Label

YWV3302EZK07
PROCESS-1 CIRCUIT BOARD

SYM-BOL NO.	PART NO.	DESCRIPTION
PCB7	★YWV3302ZK07	Printed Circuit Board Assembly
IC701~703	AN614	Integrated Circuit
IC704	★YWMC14049BCP	Integrated Circuit
IC705	YWHD74LS04P	Integrated Circuit
IC706	YWHD74LS00P	Integrated Circuit
IC707	★YWHD74LS08P	Integrated Circuit
IC708	YWMD74LS107P	Integrated Circuit
IC709	★MN6065	Integrated Circuit
Q701	2SC828-QR	Transistor
Q702,703	2SC828-RS	Transistor
Q704	2SA564-RS	Transistor
Q705	2SC828-RS	Transistor
Q706,707	2SC1047-CD	Transistor
Q708	2SC828-QR	Transistor
Q709	2SC1047-CD	Transistor
Q710	2SA838-BC	Transistor
Q711	2SK68A-MN	Transistor
Q712	YUT2SK68A-K	Field Effect Transistor
Q713	2SA684-RS	Field Effect Transistor
Q714,715	2SC1317-QR	Transistor
Q716	2SA719-QR	Transistor
Q717,718	2SC828-QR	Transistor
Q719,720	2SA564-RS	Transistor
Q721	2SC1327-TU	Transistor
Q722	2SC1047-CD	Transistor
Q723	2SC828-QR	Transistor
Q724	YUT2SC2259GH	Transistor
Q725	2SC828-QR	Transistor
Q726,727	2SC1047-CD	Transistor
Q728	2SA564-RS	Transistor
Q729	2SC1047-CD	Transistor
Q730	2SC828-RS	Transistor
Q731	2SC1047-CD	Transistor
Q732	2SA838-BC	Transistor
Q733~735	2SC828-QR	Transistor
Q736	2SA1061-P	Transistor
Q737	2SC1317-RS	Transistor
Q738	2SC1327-TU	Transistor
Q739	2SA721-TU	Transistor
Q740	2SC1317-QR	Transistor
Q741	2SC828-QR	Transistor
Q742	2SC1327-TU	Transistor
Q743	2SC828-QR	Transistor
Q744	2SA564-QR	Transistor
Q745,746	2SC828-QR	Transistor
Q747	2SA564-QR	Transistor
Q748	2SC828-QR	Transistor
Q749	2SC1047-CD	Transistor
Q750~752	2SC828-QR	Transistor
D701,702	MA150	Diode
D704	MA150	Diode
D705	YUDWZ-065	Zener Diode
D706,707	MA150	Diode
D708	XZ-070	Zener Diode
D709~711	MA150	Diode
D712	OA90	Diode
D713	YUDXZ-062	Zener Diode
D714	YUDXZ068	Zener Diode
D715	LN23L	Light Emitting Diode
D716	MA150	Diode
D717	MA26W	Diode
D718	YUDIS1588	Diode
D719	YUDIS2139C	Diode
D720,721	MA150	Diode
DL701	★EFDEN645A11D	Delay Line
DL702	ELT-10S502	Delay Line
Xtal1	★YWHC18U8R8M	Crystal
Xtal2	YWHCGU2R5M	Crystal
R701	ERD18TJ102	Carbon Film 1KΩ ⅛W
R702	ERD18TJ682	Carbon Film 6.8KΩ ⅛W
R703	ERD18TJ182	Carbon Film 1.8KΩ ⅛W
R704	ERD18TJ223	Carbon Film 22KΩ ⅛W
R705	ERD18TJ750	Carbon Film 75Ω ⅛W
R706	ERD18TJ121	Carbon Film 120Ω ⅛W
R707	ERD18TJ561	Carbon Film 560Ω ⅛W
R708	ERD18TJ221	Carbon Film 220Ω ⅛W
R709	ERD18TJ102	Carbon Film 1KΩ ⅛W
R710	ERD18TJ184	Carbon Film 180KΩ ⅛W
R711	ERD18TJ682	Carbon Film 6.8KΩ ⅛W
R712	ERD18TJ681	Carbon Film 680Ω ⅛W
R713	ERD18TJ273	Carbon Film 270KΩ ⅛W
R714	ERD18TJ391	Carbon Film 390Ω ⅛W
R715	ERD18TJ821	Carbon Film 820Ω ⅛W
R716	ERD18TJ391	Carbon Film 390Ω ⅛W
R717	ERD18TJ153	Carbon Film 15KΩ ⅛W

SYMBOL NO.	PART NO.	DESCRIPTION		
R718	ERD18TJ102	Carbon Film	1KΩ	⅛W
R719	ERD18TJ153	Carbon Film	15KΩ	⅛W
R720	ERD18TJ222	Carbon Film	2.2KΩ	⅛W
R721	ERD18TJ221	Carbon Film	220Ω	⅛W
R722	ERD18TJ222	Carbon Film	2.2KΩ	⅛W
R723	ERD18TJ682	Carbon Film	6.8KΩ	⅛W
R724	ERD18TJ182	Carbon Film	1.8KΩ	⅛W
R725,726	ERD18TJ562	Carbon Film	5.6KΩ	⅛W
R727	ERD18TJ100	Carbon Film	10Ω	⅛W
R728	ERD18TJ392	Carbon Film	3.9KΩ	⅛W
R729	ERD18TJ223	Carbon Film	22KΩ	⅛W
R730	ERD14VJ332	Carbon Film	3.3KΩ	¼W
R731	ERD14TJ333	Carbon Film	33KΩ	¼W
R732	ERD18TJ124	Carbon Film	120KΩ	⅛W
R733	ERD18TJ391	Carbon Film	390Ω	⅛W
R734	ERD18TJ563	Carbon Film	56KΩ	⅛W
R735	ERD18TJ103	Carbon Film	10KΩ	⅛W
R736	ERD18TJ222	Carbon Film	2.2KΩ	⅛W
R737	ERD18TJ103	Carbon Film	10KΩ	⅛W
R738,739	ERD18TJ102	Carbon Film	1KΩ	⅛W
R740	ERD18TJ272	Carbon Film	2.7KΩ	⅛W
R741	ERD18TJ471	Carbon Film	470Ω	⅛W
R742	ERD18TJ101	Carbon Film	100Ω	⅛W
R743	ERD18TJ680	Carbon Film	68Ω	⅛W
R744	ERD18TJ100	Carbon Film	10Ω	⅛W
R745	ERD14VJ681	Carbon Film	680Ω	¼W
R746	ERD14VJ162	Carbon Film	1.6KΩ	¼W
R747,748	ERD18TJ102	Carbon Film	1KΩ	⅛W
R749	ERD18TJ472	Carbon Film	4.7KΩ	⅛W
R750	ERD18TJ392	Carbon Film	3.9KΩ	⅛W
R751	ERD18TJ222	Carbon Film	2.2KΩ	⅛W
R752	ERD18TJ103	Carbon Film	10KΩ	⅛W
R753	ERD18TJ393	Carbon Film	39KΩ	⅛W
R754	ERD18TJ102	Carbon Film	1KΩ	⅛W
R755	ERD18TJ392	Carbon Film	3.9KΩ	⅛W
R756	ERD18TJ682	Carbon Film	6.8KΩ	⅛W
R757	ERD18TJ472	Carbon Film	4.7KΩ	⅛W
R758	ERD18TJ683	Carbon Film	68KΩ	⅛W
R759	ERD18TJ821	Carbon Film	820Ω	⅛W
R760	ERD18TJ392	Carbon Film	3.9KΩ	⅛W
R761	ERD18TJ271	Carbon Film	270Ω	⅛W
R762	ERD18TJ821	Carbon Film	820Ω	⅛W
R763	ERD18TJ102	Carbon Film	1KΩ	⅛W
R764	ERSB20J151	Temperature Sensitive Resistor	560Ω	
R765	ERD18TJ821	Carbon Film	8.2KΩ	⅛W
R766	ERD18TJ561	Carbon Film	560Ω	⅛W
R767,768	ERS-B20J561	Temperature Sensitive Resistor	150Ω	
R769	ERD18TJ392	Carbon Film	3.9KΩ	⅛W
R770	ERD18TJ471	Carbon Film	470Ω	⅛W
R771	ERD18TJ821	Carbon Film	820Ω	⅛W
R772	ERD18TJ272	Carbon Film	2.7KΩ	⅛W
R773	ERD14VJ102	Carbon Film	1KΩ	¼W
R774	ERD18TJ561	Carbon Film	560Ω	⅛W
R775	ERD18TJ681	Carbon Film	680Ω	⅛W
R776	ERD14VJ102	Carbon Film	1KΩ	¼W
R777	ERD18TJ471	Carbon Film	470Ω	⅛W
R778	ERD18TJ100	Carbon Film	10Ω	⅛W
R779	ERD18TJ331	Carbon Film	330Ω	⅛W
R780	ERD18TJ222	Carbon Film	2.2KΩ	⅛W
R781	ERD18TJ331	Carbon Film	330Ω	⅛W
R782	ERD18TJ102	Carbon Film	1KΩ	⅛W
R783	ERD18TJ331	Carbon Film	330Ω	⅛W
R784	ERD18TJ271	Carbon Film	270Ω	⅛W
R785	ERD18TJ273	Carbon Film	27KΩ	⅛W
R786	ERD18TJ332	Carbon Film	3.3KΩ	⅛W
R787	ERD18TJ102	Carbon Film	1KΩ	⅛W
R788	ERD18TJ562	Carbon Film	5.6KΩ	⅛W
R789	ERD18TJ332	Carbon Film	3.3KΩ	⅛W
R790	ERD18TJ682	Carbon Film	6.8KΩ	⅛W
R791	ERD18TJ222	Carbon Film	2.2KΩ	⅛W
R792	ERD18TJ103	Carbon Film	10KΩ	⅛W
R793	ERD14VJ821	Carbon Film	820Ω	⅛W
R794	ERD18TJ103	Carbon Film	10KΩ	⅛W
R795	ERD18TJ562	Carbon Film	5.6KΩ	⅛W
R796	ERD18TJ222	Carbon Film	2.2KΩ	⅛W
R797	ERD18TJ102	Carbon Film	1KΩ	⅛W
R798	ERD18TJ103	Carbon Film	10KΩ	⅛W
R799	ERD18TJ562	Carbon Film	5.6KΩ	⅛W
R901	ERD18TJ332	Carbon Film	3.3KΩ	¼W
R902	ERD18TJ391	Carbon Film	390Ω	⅛W
R903	ERD18TJ470	Carbon Film	47Ω	⅛W
R904	ERD18TJ223	Carbon Film	22KΩ	⅛W
R905	ERD18TJ473	Carbon Film	47KΩ	⅛W
R906	ERD18TJ681	Carbon Film	680Ω	⅛W
R907	ERD18TJ153	Carbon Film	15KΩ	⅛W
R908	ERD18TJ102	Carbon Film	1KΩ	⅛W
R909	ERD18TJ471	Carbon Film	470Ω	⅛W
R910	ERD18TJ223	Carbon Film	22KΩ	⅛W
R911	ERD18TJ473	Carbon Film	47KΩ	⅛W
R912	ERD18TJ153	Carbon Film	15KΩ	⅛W
R913	ERD18TJ102	Carbon Film	1KΩ	⅛W
R914	ERD18TJ122	Carbon Film	1.2KΩ	⅛W
R915,916	ERD18TJ822	Carbon Film	8.2KΩ	⅛W
R917	ERD18TJ333	Carbon Film	33KΩ	⅛W
R918	ERD18TJ473	Carbon Film	47KΩ	⅛W
R919	ERD18TJ153	Carbon Film	15KΩ	⅛W
R920	ERD18TJ333	Carbon Film	33KΩ	⅛W
R921,922	ERD18TJ562	Carbon Film	5.6KΩ	⅛W
R923	ERD18TJ332	Carbon Film	3.3KΩ	⅛W
R924	ERD18TJ393	Carbon Film	39KΩ	⅛W
R925	ERD18TJ682	Carbon Film	6.8KΩ	⅛W
R926	ERD18TJ331	Carbon Film	330Ω	⅛W
R927,928	ERD18TJ102	Carbon Film	1KΩ	⅛W
R929	ERD18TJ104	Carbon Film	100KΩ	⅛W
R930	ERD18TJ303	Carbon Film	30KΩ	⅛W
R931	ERD18TJ102	Carbon Film	1KΩ	⅛W
R932	ERD18TJ333	Carbon Film	33KΩ	⅛W
R933	ERD18TJ562	Carbon Film	5.6KΩ	⅛W
R934	ERD18TJ153	Carbon Film	15KΩ	⅛W
R935	ERD18TJ562	Carbon Film	5.6KΩ	⅛W

SYMBOL NO.	PART NO.	DESCRIPTION		
R936~938	ERD14VJ222	Carbon Film	2.2KΩ	¼W
R939	ERD18TJ331	Carbon Film	330Ω	⅛W
R940	ERD18TJ681	Carbon Film	680Ω	⅛W
R941	ERD18TJ331	Carbon Film	330Ω	⅛W
R942	ERD18TJ681	Carbon Film	680Ω	⅛W
R943	ERO25CKF5101	Metal Film	5.1KΩ	¼W
R944	ERO25CKF1002	Metal Film	10KΩ	¼W
R945,946	ERD18TJ103	Carbon Film	10KΩ	⅛W
R948	ERD18TJ183	Carbon Film	18KΩ	⅛W
R949	ERD18TJ103	Carbon Film	10KΩ	⅛W
R950	ERD18TJ102	Carbon Film	1KΩ	⅛W
R951	ERD18TJ271	Carbon Film	270Ω	⅛W
R952	ERD14VJ561	Carbon Film	560Ω	¼W
R953	ERD14VJ222	Carbon Film	2.2KΩ	¼W
BR701	EXB-H84044B	Block Resistor		
VR701,702	EVNK0AA00B14	Variable Resistor		
VR703	EVNK0AA00B24	Variable Resistor		
VR705	EVNK0AA00B23	Variable Resistor		
VR706	EVNK0AA00B13	Variable Resistor		
VR707,708	EVNK0AA00B14	Variable Resistor		
VR709	EVNK0AA00B13	Variable Resistor		
C701	ECEA1AS470	Electrolytic	47μF	10V
C702,703	ECEA0JS101	Electrolytic	100μF	6.3V
C704,705	ECEA1CS470	Electrolytic	47μF	16V
C706~709	ECQM1H472KZ	Polyester	0.0047μF	50V
C710	ECCD1H120K	Ceramic	12pF	50V
C711	ECCD1H680K	Ceramic	68pF	50V
C712~715	ECEA1CS100	Electrolytic	10μF	16V
C716	ECEA1CS101	Electrolytic	100μF	16V
C718,719	ECEA1AS470	Electrolytic	47μF	10V
C720	ECEA1AS102	Electrolytic	1000μF	10V
C721	ECEA1CS221	Electrolytic	220μF	16V
C722	ECEA0JS101	Electrolytic	100μF	6.3V
C723	ECCD1H510JC	Ceramic	51pF	50V
C724	ECQM1H472KZ	Polyester	0.0047μF	50V
C725	ECEA1HSR47	Electrolytic	0.47μF	50V
C726	ECSZ35EFR47Q	Tantalum	0.47μF	35V
C727	ECEA1AS470	Electrolytic	47μF	10V
C728	ECEA1CS100	Electrolytic	10μF	16V
C729	ECEA16N47U	Electrolytic	47μF	16V
C730	ECCD1H330JC	Ceramic	33pF	50V
C731	ECEA1AS470	Electrolytic	47μF	10V
C732	ECEA0JS101	Electrolytic	100μF	6.3V
C733	ECQS1271JW	Styrol	270pF	125V
C734	ECCD1H270JR	Ceramic	27pF	50V
C735,736	ECEA1CS100	Electrolytic	10μF	16V
C738	ECQM1H472KZ	Polyester	0.0047μF	50V
C739	ECQM1H102KZ	Polyester	0.001μF	50V
C741	ECQM1H472KZ	Polyester	0.0047μF	50V
C742	ECEA1ES470	Electrolytic	47μF	25V
C743	ECCD1H221K	Ceramic	220pF	50V
C744,745	ECEA1CS470	Electrolytic	47μF	16V
C746	ECEA1AS470	Electrolytic	47μF	10V
C747	ECQM1H104KZ	Polyester	0.1μF	50V
C748	ECCD1H121K	Ceramic	120pF	50V

SYMBOL NO.	PART NO.	DESCRIPTION		
C749,750	ECEA1CS470	Electrolytic	47μF	16V
C751	ECQM1H472KZ	Polyester	0.0047μF	50V
C752	ECQM1H102KZ	Polyester	0.001μF	50V
C753	ECCD1H560JC	Ceramic	56pF	50V
C754	ECCD1H221JC	Ceramic	220pF	50V
C755	ECEA1CS470	Electrolytic	47μF	16V
C756~759	ECQM1H472KZ	Polyester	0.0047μF	50V
C760	ECEA0JS101	Electrolytic	100μF	6.3V
C761	ECQM1H102KZ	Polyester	0.001μF	50V
C762	ECCD1H680K	Ceramic	68pF	50V
C763	ECCD1H510JC	Ceramic	51pF	50V
C764	ECCD1H680K	Ceramic	68pF	50V
C765	ECCD1H270K	Ceramic	27pF	50V
C766,767	ECCD1H101JC	Ceramic	100pF	50V
C769	ECCD1H060DR	Ceramic	6pF	50V
C770	ECCD1H360JR	Ceramic	36pF	50V
C771	ECEA1AS470	Electrolytic	47μF	10V
C772	ECCD1H100JC	Ceramic	10pF	50V
C774	ECCD1H101K	Ceramic	100pF	50V
VC701	ECV1ZW50X40E	Trimmer Capacitor	50pF	
VC703	ECV1ZW25X53N	Trimmer Capacitor	25pF	
L701	YWEL06108R2J	Inductance	82μF	
L702	YWLS-78R2J	Inductance	8.2μH	
L703	YWLS-7821J	Inductance	820μH	
L704,705	YWEL06108R2J	Inductance	82μH	
L706	YWEL0610101J	Inductance	100μH	
L707	YWLS-7330J	Inductance	33μH	
CL701	EFCA3R58MB3	Ceramic Filter		
T701	ELT-7Q701B	Detector Transformer		
SW701	YWIPS287-3	Power Switch		
F701	YWTS2R5A	2.5A Fuse		
E25	YWSMV3J06045	Jumper Cable		
E26	YWSMV3J10045	Jumper Cable (X2)		
E27	YWSN5053	Fuse Holder (X2)		
TP-E, TP701~709	TEST-PIN	Test Point Pin (X11)		
CN701-JM	EMCS1001E	10-Pin Camera Jack-Female		
CN702, 703-JM	EMCS0851K	8-Pin Jack Male		
S1	YWIC4914062	IC Socket		
M109	YWV3302CM02	Rear Chassis		
M111	YWSR6W-1	Cord Bushing		
M112	YWV3302AM02	Fastening Bracket for Bushing		
M113	YWV3302AM07	Support Bracket for 10-Pin Camera Jack-Female		
M114	YWE6400FR09	Support Bracket for Light Emitting Diode		
M115	YWV3302AM08	Holder Bracket for Power Switch		
M116	YWV3302LB04	Insulator Washer (X2)		

YWV3302EZK08
PROCESS-2 CIRCUIT BOARD

SYMBOL NO.	PART NO.	DESCRIPTION
PCB8	★ YWV3302ZK08	Printed Circuit Board Assembly
IC801	AN610	Integrated Circuit
IC802,803	AN614	Integrated Circuit
Q801	2SA838-CD	Transistor
Q802	2SC828-QR	Transistor

SYM-BOL NO.	PART NO.	DESCRIPTION		
Q803~Q806	2SC1047-CD	Transistor		
Q807	2SA838-CD	Transistor		
Q808	2SC828-QR	Transistor		
Q809~Q811	2SC1047-CD	Transistor		
Q812	2SA838-CB	Transistor		
Q813,814	2SC1047-CD	Transistor		
Q815	2SC1317-RS	Transistor		
Q816	2SC828-QR	Transistor		
Q817	2SC1317-RS	Transistor		
Q818	2SC828-QR	Transistor		
Q819	2SA564-QR	Transistor		
Q820~Q822	2SC828-RS	Transistor		
Q823	2SA564-QR	Transistor		
Q824	2SC828-QR	Transistor		
Q825	2SC1047-CD	Transistor		
Q826,827	2SA564-QR	Transistor		
Q828,829	2SC1047-CD	Transistor		
Q830	2SC1327-TU	Transistor		
Q831	2SC828-QR	Transistor		
Q832,833	2SC1047-CD	Transistor		
Q834	YUT2SC2259GH	Transistor		
Q835	2SC828-QR	Transistor		
Q836	2SC1047-CD	Transistor		
Q837	2SA564-RS	Transistor		
Q838,839	2SC1327-TU	Transistor		
Q840	2SA564-QR	Transistor		
Q841	2SA721-TU	Transistor		
Q842	2SA564-QR	Transistor		
Q843	2SA564-RS	Transistor		
Q844,845	2SC828-RS	Transistor		
D801	YUDIS1588	Diode		
D802	MA26W	Diode		
D803,804	MA150	Diode		
DL801	★ EFDEN645K84A	Delay Line		
R002	ERD18TJ121	Carbon Film	120Ω	1/8W
R801	ERD18TJ102	Carbon Film	1KΩ	1/8W
R802	ERD18TJ101	Carbon Film	100Ω	1/8W
R803	ERD18TJ182	Carbon Film	1.8KΩ	1/8W
R804	ERD18TJ102	Carbon Film	1KΩ	1/8W
R805	ERD18TJ470	Carbon Film	47Ω	1/8W
R806	ERD18TJ222	Carbon Film	2.2KΩ	1/8W
R807	ERD18TJ102	Carbon Film	1KΩ	1/8W
R808	ERD18TJ152	Carbon Film	1.5KΩ	1/8W
R809	ERD18TJ221	Carbon Film	220Ω	1/8W
R810	ERD18TJ182	Carbon Film	1.8KΩ	1/8W
R811	ERD18TJ102	Carbon Film	1KΩ	1/8W
R812	ERD18TJ470	Carbon Film	47Ω	1/8W
R813	ERD18TJ272	Carbon Film	2.7KΩ	1/8W
R814	ERD18TJ222	Carbon Film	2.2KΩ	1/8W
R815,816	ERD18TJ102	Carbon Film	1KΩ	1/8W
R817	ERD18TJ680	Carbon Film	68Ω	1/8W
R818	ERD18TJ182	Carbon Film	1.8KΩ	1/8W
R819	ERD18TJ103	Carbon Film	10KΩ	1/8W
R820	ERD18TJ122	Carbon Film	1.2KΩ	1/8W
R821	ERD18TJ682	Carbon Film	6.8KΩ	1/8W
R822	ERD18TJ152	Carbon Film	1.5KΩ	1/8W
R823	ERD18TJ682	Carbon Film	6.8KΩ	1/8W
R824	ERD18TJ562	Carbon Film	5.6KΩ	1/8W
R825	ERD18TJ122	Carbon Film	1.2KΩ	1/8W
R826,827	ERD18TJ821	Carbon Film	820Ω	1/8W
R828	ERD18TJ152	Carbon Film	1.5KΩ	1/8W
R830,831	ERD18TJ221	Carbon Film	220Ω	1/8W
R832	ERD18TJ561	Carbon Film	560Ω	1/8W
R833	ERD18TJ152	Carbon Film	1.5KΩ	1/8W
R834	ERD18TJ331	Carbon Film	330Ω	1/8W
R835	ERD18TJ472	Carbon Film	4.7KΩ	1/8W
R836	ERD18TJ103	Carbon Film	10KΩ	1/8W
R837	ERD18TJ152	Carbon Film	1.5KΩ	1/8W
R838	ERD18TJ392	Carbon Film	3.9KΩ	1/8W
R839	ERD18TJ103	Carbon Film	10KΩ	1/8W
R840	ERD18TJ472	Carbon Film	4.7KΩ	1/8W
R841	ERD18TJ223	Carbon Film	22KΩ	1/8W
R842	ERD18TJ561	Carbon Film	560Ω	1/8W
R843	ERD18TJ102	Carbon Film	1KΩ	1/8W
R844	ERD18TJ390	Carbon Film	39Ω	1/8W
R845	ERD18TJ102	Carbon Film	1KΩ	1/8W
R846,847	ERD18TJ561	Carbon Film	560Ω	1/8W
R848	ERD18TJ102	Carbon Film	1KΩ	1/8W
R849	ERS-B22J121	Temperature Sensitive Resistor	120Ω	
R850,851	ERD18TJ392	Carbon Film	3.9KΩ	1/8W
R852,853	ERD18TJ432	Carbon Film	4.3KΩ	1/8W
R854	ERD18TJ272	Carbon Film	2.7KΩ	1/8W
R855	ERD18TJ681	Carbon Film	680Ω	1/8W
R856	ERD18TJ821	Carbon Film	820Ω	1/8W
R857	ERD18TJ681	Carbon Film	680Ω	1/8W
R858	ERD18TJ223	Carbon Film	22KΩ	1/8W
R859	ERD18TJ151	Carbon Film	150Ω	1/8W
R860	ERD18TJ101	Carbon Film	100Ω	1/8W
R861	ERD18TJ561	Carbon Film	560Ω	1/8W
R862	ERD18TJ102	Carbon Film	1KΩ	1/8W
R863	ERD18TJ682	Carbon Film	6.8KΩ	1/8W
R864	ERD18TJ152	Carbon Film	1.5KΩ	1/8W
R865	ERD18TJ391	Carbon Film	390Ω	1/8W
R866	ERD18TJ222	Carbon Film	2.2KΩ	1/8W
R867	ERD18TJ103	Carbon Film	10KΩ	1/8W
R868	ERD18TJ152	Carbon Film	1.5KΩ	1/8W
R869	ERD18TJ392	Carbon Film	3.9KΩ	1/8W
R870	ERD18TJ152	Carbon Film	1.5KΩ	1/8W
R871	ERD18TJ821	Carbon Film	820Ω	1/8W
R872	ERD18TJ681	Carbon Film	680Ω	1/8W
R873	ERD18TJ272	Carbon Film	2.7KΩ	1/8W
R874	ERD18TJ122	Carbon Film	1.2KΩ	1/8W
R875,876	ERD18TJ102	Carbon Film	1KΩ	1/8W
R877	ERD18TJ332	Carbon Film	3.3KΩ	1/8W
R878	ERD18TJ221	Carbon Film	220Ω	1/8W
R879	ERD18TJ472	Carbon Film	4.7KΩ	1/8W
R880	ERD18TJ273	Carbon Film	27KΩ	1/8W
R881	ERD18TJ682	Carbon Film	6.8KΩ	1/8W
R882	ERD18TJ272	Carbon Film	2.7KΩ	1/8W
R883	ERD18TJ102	Carbon Film	1KΩ	1/8W
R884	ERD18TJ680	Carbon Film	68Ω	1/8W

SYM-BOL NO.	PART NO.	DESCRIPTION		
R885	ERD18TJ102	Carbon Film	1KΩ	1/8W
R886	ERD18TJ562	Carbon Film	5.6KΩ	1/8W
R887	ERD18TJ823	Carbon Film	82KΩ	1/8W
R888,889	ERD18TJ681	Carbon Film	680Ω	1/8W
R890	ERD18TJ822	Carbon Film	8.2KΩ	1/8W
R891	ERD18TJ103	Carbon Film	10KΩ	1/8W
R892	ERD18TJ331	Carbon Film	330Ω	1/8W
R893	ERD18TJ681	Carbon Film	680Ω	1/8W
R894	ERD18TJ561	Carbon Film	560Ω	1/8W
R895	ERD18TJ103	Carbon Film	10KΩ	1/8W
J801~815	ERD14TD	Short Pin		
BR801	EXB-H88034K	Block Resistor		
BR802	EXB-H88053J	Block Resistor		
BR803	EXB-H87037J	Block Resistor		
BR804	EXB-H811038J	Block Resistor		
VR801	EVHE2AK15B13	Variable Resistor		
VR802	EVNK0AA00B13	Variable Resistor		
VR803,804	EVNK0AA00B23	Variable Resistor		
VR805	EVHE2AK15B13	Variable Resistor		
VR806	EVNK0AA00B13	Variable Resistor		
VR807,808	EVNK0AA00B23	Variable Resistor		
VR809~ VR816	EVNK0AA00B15	Variable Resistor		
VR817	EVNK0AA00B32	Variable Resistor		
VR818~ VR821	EVNK0AA00B53	Variable Resistor		
VR822	EVNK0AA00B13	Variable Resistor		
VR823	EVNK0AA00B32	Variable Resistor		
VR824	EVNK4AA00B23	Variable Resistor		
C801	ECEA1HS010	Electrolytic	1μF	50V
C802	ECQM1H472KZ	Polyester	0.0047μF	50V
C803	ECEA1CS470	Electrolytic	47μF	16V
C804	ECEA1CS100	Electrolytic	10μF	16V
C805	ECCD1H820J	Ceramic	82pF	50V
C806	ECQM1H472KZ	Polyester	0.0047μF	50V
C807	ECEA1HS010	Electrolytic	1μF	50V
C808	ECEA1CS470	Electrolytic	47μF	16V
C809	ECQM1H472KZ	Polyester	0.0047μF	50V
C810	ECEA1CS100	Electrolytic	10μF	16V
C811	ECCD1H820J	Ceramic	82pF	50V
C812	ECEA1CS100	Electrolytic	10μF	16V
C813	ECSZ16EF6R8Q	Tantalum	6.8μF	16V
C814	ECEA1HS2R2	Electrolytic	2.2μF	50V
C815	ECQM1H273KZ	Polyester	0.027μF	50V
C816	ECQM1H103KZ	Polyester	0.01μF	50V
C817	ECEA1CS100	Electrolytic	10μF	16V
C818	ECEA1AS470	Electrolytic	47μF	10V
C819,820	ECQM1H472KZ	Polyester	0.0047μF	50V
C821	ECCD1H470JR	Ceramic	47pF	50V
C822	ECCD1H180JR	Ceramic	18pF	50V
C823	ECQS1271JW	Styrol	270pF	125V
C824	ECQM1H472KZ	Polyester	0.0047μF	50V
C826	ECSZ16EF47Q	Tantalum	47μF	16V
C827~ C829	ECQM1H472KZ	Polyester	0.0047μF	50V
C830,831	ECEA1CS100	Electrolytic	10μF	16V

SYM-BOL NO.	PART NO.	DESCRIPTION		
C832	ECCD1H221K	Ceramic	220pF	50V
C833	ECKD1H471KB	Ceramic	470pF	50V
C834	ECQM1H104KZ	Polyester	0.1μF	50V
C835	ECCD1H680K	Ceramic	68pF	50V
C836	ECEA1AS470	Electrolytic	47μF	10V
C837	ECEA1CS470	Electrolytic	47μF	16V
C838~ C840	ECEA1CS100	Electrolytic	10μF	16V
C841	ECQS1301JW	Styrol	300pF	125V
C842	ECCD1H101JR	Ceramic	100pF	50V
C843,844	ECQS1221JW	Styrol	220pF	125V
C845	ECCD1H151JR	Ceramic	150pF	50V
C846	ECCD1H560JR	Ceramic	56pF	50V
C847	ECQM1H102KZ	Polyester	0.001μF	50V
C848	ECEA1CS470	Electrolytic	47μF	16V
C849~ C851	ECEA1AS470	Electrolytic	47μF	10V
C852	ECEA1CS470	Electrolytic	47μF	16V
C855	ECQM1H472KZ	Polyester	0.0047μF	50V
C856	ECCD1H220JC	Ceramic	22pF	50V
VC801	ECV1ZW50X40	Trimmer Capacitor	50pF	
L801,802	YWEL06108R2J	Inductance	8.2μH	
L803	YWLS-7390J	Inductance	39μH	
L804	YWLS-7101J	Inductance	100μH	
L805	YWLS-76R8J	Inductance	6.8μH	
L806,807	YWLS-7150J	Inductance	15μH	
L808	YWLS-7390J	Inductance	39μH	
L809	YWEL06108R2J	Inductance	8.2μH	
L810	YWLS-7561J	Inductance	560μH	
L811	YWLS-7431J	Inductance	430μH	
L812	YWLS-7221J	Inductance	220μH	
L813	YWLS-7270J	Inductance	27μH	
L814	YWLS-7560J	Inductance	56μH	
ZT801,802	ELB-6D709	Frequency Trap		
ZT803	ELB-6D708	Frequency Trap		
ZT804	ELB-6D710	Frequency Trap		
T801~ T803	ELT-7Q701A	Intermediate Frequency Transformer		
T804	ELT-10S501	Intermediate Frequency Transformer		
SW801	YWSRZL044	Switch		
TP801~810	TEST-PIN	Test Pin (X10)		
E35	YWSMV3J03105	Test Point Pin (X13)		
E36	YWSMV3J08085	Jumper Cable		
M122	YWV3302CM01	Jumper Cable		

WV-3300E/3310E ACCESSORY PARTS/PACKAGING PARTS

M141	★YWV3300PXR1A	Soft Case for Camera Head [WV-3300E Only]
M142	XZB26X40C05	Polyethylene Bag A
M143	YWV6X17C	Zoom Lens [WV-3300E Only]
	YWBC-2B	Body Cap [WV-3310E Only]
	YWCOS2518P	Zoom Lens [WV3310E Only]
M144	YWV3300ERB1A	Instruction Book [WV-3300E Only]
	YWV3310ERB1A	Instruction Book [WV-3310E Only]
M147	YWND8-58H	ND Filter [WV-3300E Only]

SYM-BOL NO.	PART NO.	DESCRIPTION
M148	YWV3302FM01	Bolt for VTR Installation
M149	YWT10X10C03	Polyethylene Bag B (X2)
M150	YWT10X35C03	Polyethylene Bag C (X2)
M151	XZB35X50A03	Polyethylene Bag D
M152	WZB20X35A01	Polyethylene Bag E
M153	YWT050803	Polyethylene Bag F
M154	YWT20X35C03	Polyethylene Bag G
M155	YWV3300EPB1B	Packing Case Complete [WV-3300E Only]
	YWV3310EPB1B	Packing Case Complete [WV-3310E Only]
M156	YWV3301FR07	Windscreen

A.C. ADAPTOR

WV-3303E MISCELLANEOUS

SYM-BOL NO.	PART NO.	DESCRIPTION
PCB12	YWV3303ZR02	Printed Circuit Board
T001	YWHPE354E41	Power Transformer
E47	YWKPTSA-8	Power Cord [WV-3303E/A Only]
	YWGTBS2F	Power Cord [WV-3303E/B Only]
	YWKP4192F22	Power Cord [WV-3303E/C Only]
E48	YWONOB3303	V.T.R. Output Cord Assembly
CN001-JF	RM15TRD-10SB	10-Pin Jack-Female
M60	YWV3303EUM1	Rear Panel E/A Only
	YWV3303EUM2	Rear Panel E/B Only
	YWV3303PUM3	Rear Panel E/C Only
M61	YWV3303KR01	Upper Cover
M62	YWS-CULRB06	Caution Label for Covers
M63	YWSR4N-4	Cord Busting [WV-3303E/B.E/C Only]
M64	YWV3303CM01	Chassis
M65	YWV3303LM03	Nut Plate A (X2)
M66	YWV3303LM04	Nut Plate B (X2)
M67	YWV3303LR01	Transformer Spacer A (X2)
M68	YWV3303LM01	Front Plate
M69	YWV3303FM01	Lock Screw (X4)
M72	YWV3303LR02	Transformer Spacer B
M73	YWV3303WM01	Lock Spring
M74	YWV3303LM02	Lock Plate
M75	YWV3303KR99	Lower Cover Assembly
(M75-1)	YWV3303WB01	Rubber Foot (X2)
M76	YWV240PUB01D	Serial No. Label
M78	YWV3303HR01	Lock Grip

YWV3303EZK01
POWER SUPPLY CIRCUIT BOARD

SYM-BOL NO.	PART NO.	DESCRIPTION
PCB11	YWV3303EZK01	Printed Circuit Board Assembly
D101~104	YUDERB12-01	Diode
C101,102	ECKDDL102ZE	Ceramic 100pF 150V
C103	ECET25R472SW	Electrolytic 4700μF 25V
F101	YWST6-1A	1A Fuse
F102	XBA1G30NU100	3A Fuse
E54	YWSN5051	Fuse Holder (X2)

WV-3303E
ACCESSORY PARTS/PACKAGING PARTS

SYM-BOL NO.	PART NO.	DESCRIPTION
E60	YWMM-FR-M	Connector
M84	YWV3303ERB1	Instruction Book
M87	YWT15X20C03	Polyethylene Bag A
M88	YWV3303EPB1	Packaging Case Complete
M89	YWT20X25C03	Polyethylene Bag B (X2)